MINING WORLD

HEAVY DENSITY. Feed is divided by a drum separator into float and sink, from which media is recovered magnetically and thickened for reuse. Float is rejected and sink forms the finished concentrate.

in this issue

Coons Pacific's Mesabi Plant

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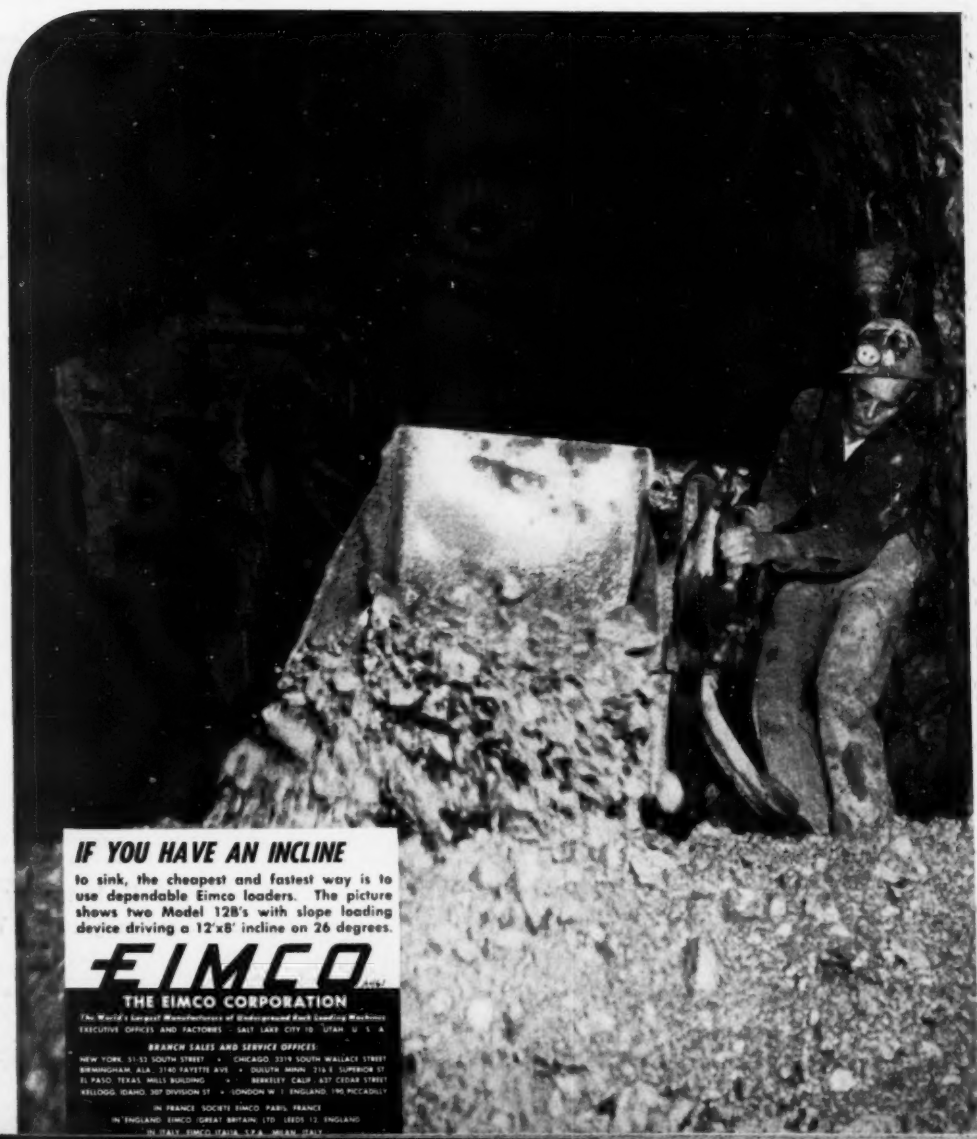
IF YOU HAVE AN INCLINE
to sink, the cheapest and fastest way is to use dependable Eimco loaders. The picture shows two Model 12B's with slope loading device driving a 12'x8' incline on 26 degrees.
EIMCO
THE EIMCO CORPORATION
The World's Largest Manufacturers of Underground Rock Loading Machines
EXECUTIVE OFFICES AND FACTORIES - SALT LAKE CITY 10, UTAH, U. S. A.
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IN FRANCE: SOCIETE EIMCO, PARIS, FRANCE
IN ENGLAND: EIMCO (GREAT BRITAIN) LTD., LEEDS 12, ENGLAND
IN ITALY: EIMCO ITALIA, S.P.A., MILAN, ITALY

JULY 1953

Vol. 15 No. 8

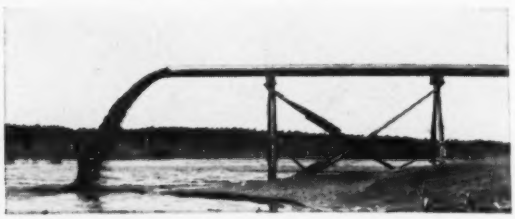
25 cents a copy
In sterling 3s

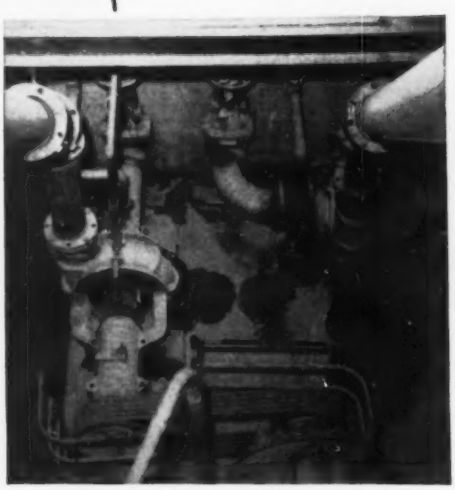
Better pumping saves money

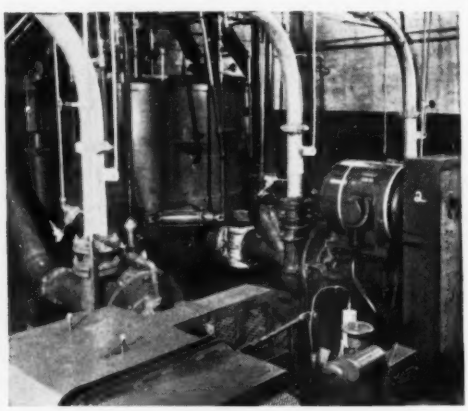
on these big, tough jobs

Mesabi iron-ore concentration plant

Iron-ore tailings discharging at pressure of 231 feet. Pumped by G-Frame Hydroseal through 7700 feet of 18-inch pipe at the rate of 446,400 gallons of pulp per hour. Static lift overcome is 76 feet.





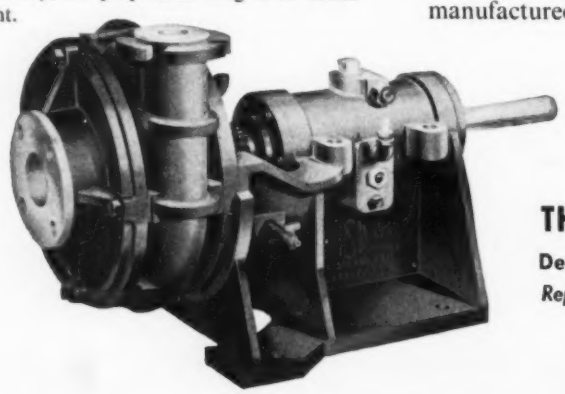


Southern coal-washing plant

Three of the twelve Hydroseals (including stand-by) that do the heavy work at this big installation in Concord, Alabama. Day in, day out, these pumps handle 1000 tons of coal per hour with a minimum of power and maintenance.

Copper plant in the Southwest

Two of the eight Hydroseal Sand Pumps (Frame B-C) which handle the ball-mill discharge at this major copper producer. Each pump can handle approximately 5500 tons of solids per day, the pulp containing 65% solids by weight.

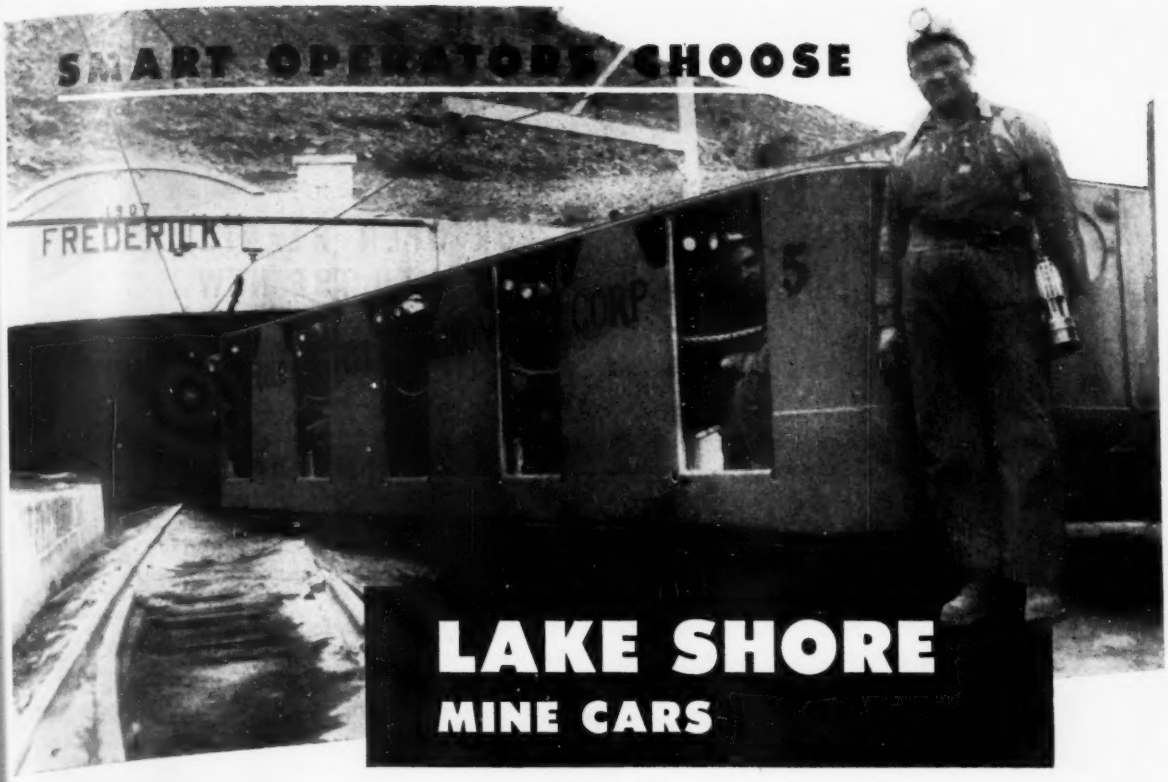


If it's a problem of handling fluid-solid mixtures, you can't go wrong if you consult your nearest Hydroseal engineer. Backed by hundreds of successful installations in all parts of the mining world, he is well fitted to help you design the best system for your plant. And because Hydroseals are manufactured in Sweden, South Africa and Australia, as well as the United States, you are assured of prompt and efficient service wherever you are. Write for our latest catalog.

THE ALLEN-SHERMAN-HOFF PUMP CO.

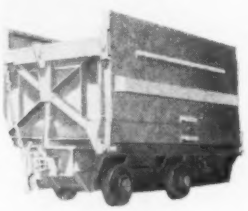
Dept. J—259 E. Lancaster Ave., Wynnewood, Pa.

Representatives throughout the World



for a safe, smooth ride . . .

THAT'S what this Lake Shore Man Haul car (above) gives 30 men . . . a dry, safe, comfortable, upright ride with plenty of knee and headroom — space on the seats for dinner boxes. Enclosed design gives men full protection. Available insulated against electricity. Car equipped with full universal oscillating trucks, or conventional type.



for heavy loads and rough service . . .

250 cubic feet — the capacity of this tough, all-welded Lake Shore Granby type side dump car . . . designed for the extremely hard loading and operating conditions met in modern, high-production mining.

a standard of reliability . . .

This 38 cubic foot Lake Shore Standard side dump car has given years of trouble-free service in mines all over the country. Time-tested, simple, sturdy design.

Write for more information on Lake Shore "job-proven" Mine Cars and Mine Equipment.

Standard and Special Mining-Milling Machinery for Every Application.

LOHED MINE CARS

JETO BOTTOM DUMP SKIP

BICYCLE SHEAVES

LAKE SHORE Engineering Company

102 IRON MOUNTAIN MICHIGAN

Jones & Laughlin

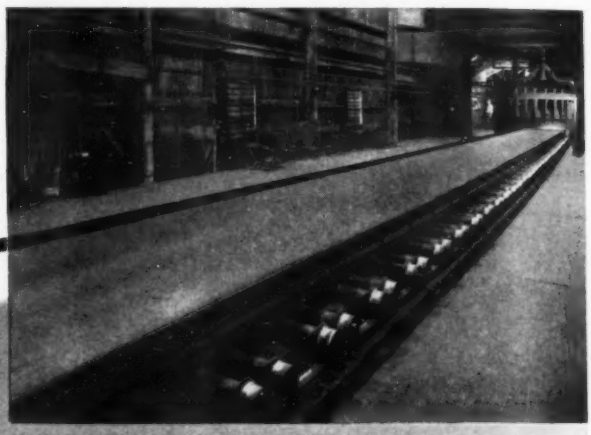
SINTERS MARTITE FOR OPEN HEARTH AND BLAST FURNACES WITH THE NEW

DWIGHT-LLOYD® Sintering machine

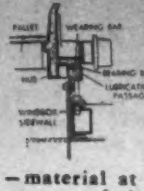
Jones & Laughlin, in their new plant at Star Lake, N. Y., achieves maximum flexibility in sintering martite with the new DWIGHT-LLOYD® Sintering machine. Because of the superior quality of the sintered martite it can be used in open hearth furnaces in place of scrap as well as for blast furnace operation.

This new model DWIGHT-LLOYD® sintering machine is designed to give maximum output along with high quality product. It is the largest ever made for iron ore operation, in size and in capacity, producing approximately 1600 tons of sinter per day. It measures 6′ 6¾″ wide by 147′ long.

Whether it is sintering martite or sintering, roasting, heat treating and agglomerating a wide variety of other ores and metals, the new Dwight-Lloyd® machine can give you increased production at lowered costs.



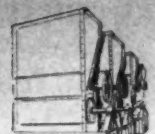
features of the NEW Dwight-Lloyd® Sintering Machine



ROWEN WINDBOX SEAL* completely eliminates air leakage between pallets and windbox, with these results: *a more uniform product* — material at edges gets same amount of air as it does in the center; *greater production* — more efficient burning permits faster operation; *lower operating costs* — a smaller air volume is needed.

COOLING SECTION-material is cooled while it is on the pallets, resulting in a better sinter and also facilitating handling and further processing.

DISCHARGE CURVE*-compound curve virtually eliminates spillage of sintered fines into the machine.



ROLL FEEDERS assure even distribution of charge as it is fed on to the pallets. Quiet and non-clogging operation.

UTILIZATION OF HOT GASES-if desired hot gases can be recirculated over the sinter bed resulting in the use of less fuel in the charge and lower plant heating cost in winter.

Pilot Plant Tests Your Materials. A pilot sintering plant is maintained for testing your materials under production line conditions. In this way we can establish your optimum sintering requirements. Write today for further details.

*PATENTED

METALLURGICAL DIVISION

SINTERING MACHINERY CORPORATION

155 SINTER AVE. • NETCONG, N. J.

GRAB SAMPLES From the Mail

11 Flits, 10 Rounds Per Shift

Dear Sir:

With reference to my article on page 30 of your February 1953 edition may I make the following points:

1. I did not write the first paragraph. It is kind of you, Sir, to make such comments on the efficiency of the mine.

2. The Conway Model 60 loader used as an elevator (two illustrations) was only used temporarily for a month or so to get us way. Since then we have only used PL11-17 elevators.

3. Percussion drilling has been entirely superseded by dry rotary drilling. We have, incidentally, had 10 rounds per rig per shift on a number of occasions recently (i.e. 11 flits, 10 rounds).

4. For 660 volts AC hoist, page 31, top last column, read 6,600 volts.

I do hope the article has been of some interest to readers.

G. V. Standerline
Manager
Santon Mining Company, Ltd.
Scunthorpe, England

The accomplishments of the mining staff deserve favorable comments. The article has been of wide interest.—Ed.

No Disparagement To Company

Dear Sir:

In your March 1953 issue is an article "Surface Water Pumped Into Shaft" on page 47 continued to page 85.

Anyone reading this article and without any local knowledge of gold mining in Africa would conclude that the engineers of the Anglo American Corporation had been entirely responsible for the planning and extension of the work. It is no disparagement to these engineers to tell you that they employed an outside firm of contractors, namely, The Cementation Co. (Africa) (Proprietary) Ltd., under contract to do their cementation work for them, in common with most of the mining houses.

A. R. Neelands
Chairman
The Cementation Co. Ltd.
Doncaster, England

Omission of the outstanding work of The Cementation Company was unintentional. South African dispatches failed to mention that the work was performed under contract.

—Ed.

Bolivia to Peru

Dear Sir:

I used to read your magazine regularly when I worked in Bolivia. I have now been engaged as concentrator foreman by the Cerro de Pasco Corporation. Please change my address.

P. J. Muysken
Morococha, Peru

MINING WORLD

Including the Export Edition **WORLD MINING**

Published monthly except in April when publication is semi-monthly

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COVER CIRCLE: The Coons Pacific Company's iron ore beneficiator near Eveleth, Minnesota has been designed to treat a variety of ores from properties operated by Pacific Isle Mining Company and E. W. Coons Company. Heavy density is an important part of this versatile operation.

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General Manager, San Francisco M. F. HOLSINGER
Editor GEORGE O. ARGALL, JR.
Field Editor R. L. BURNS
News Editor J. M. TAYLOR
Assistant News Editor A. SENZEK
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Branch Offices
New York 17 . 370 Lex. Ave., Murray Hill 3-9295
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STAFF CORRESPONDENTS IN THE FOLLOWING CITIES AND MINING CENTERS:

Africa: Accra, Gold Coast; Costermansville, Belgian Congo; Johannesburg, Union of South Africa; and Kitwe, Northern Rhodesia. **Asia:** Ankara, Turkey; Benares, India; Kuala Lumpur, Federated Malay States; and Tokyo, Japan. **Europe:** Frankfurt, West Germany; Helsinki, Finland; London, England; Madrid, Spain; Paris, France; Redruth, Cornwall; Rome, Italy; Stockholm, Sweden; The Hague, Netherlands; and Trondheim, Norway. **North and Central America:** Mexico City, Mexico; San Jose, Costa Rica; and Vancouver, British Columbia. **Oceania:** Port Kembla, (N.S.W.) Australia. **South America:** Bernal, Argentina; La Paz, Bolivia; Lima, Peru; Quito, Ecuador; and Sao Paulo, Brazil.

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INSURE

2-wheel prime-movers

122, 186, 275-325, 450 h.p.... speeds from 28 to 40 m.p.h. Power steer . . . 90° turns . . . power-proportioning differential . . . multiple-disc air brakes . . . constant-mesh or sliding-gear transmission . . . torque converter optional on 186 to 450 h.p. units.

Note: LeTourneau also makes Tournatractor,** a 4-wheel prime-mover on rubber with similar versatility.

FOR SHOVEL LOADING

9 to 50-ton Tournarocker*

For hauling overburden, rock or ore, this highly-maneuverable Rear-Dump can't be beat. Unit turns around in less than own length, spots quickly. Wide bowl provides big target for shovel operator, reduces spillage, saves shovel swings. With front-wheel drive and independently operated rear-wheel brakes, rig backs to edge . . . dumps well over bank to eliminate rehandling . . . pulls away safely from soft edge. Triple-reinforced, all-steel bowl withstands heavy use. Induction body heating available for cold-weather operations.

FOR BOTTOM-DUMP HAUL

18 to 50-ton Tournahopper*

Clamshell doors of Tournahopper open wide for fast, clean dump of even the stickiest material. As bottom swings clear under full power it wipes clean against hopper sides. Bottom opening is same size as top to clear boulders, stumps. No dangling gates. Square type bowl makes easy shovel or clamshell target, speeds loading. Big low-pressure tires, power-proportioning differential (which automatically allocates most power to drive wheel on firmest footing) give high flotation and positive traction in soft material.

LeTourneau-Westinghouse

YOUR FUTURE

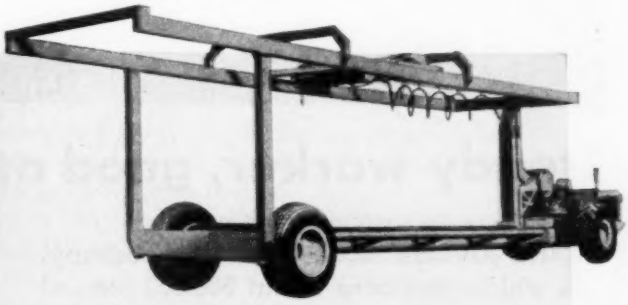
Cut costs on more mine operations with LeTourneau interchangeability

In stripping overburden, excavating and hauling ore, you can substantially lower your investment with high-speed, convertible LeTourneau equipment. To best fit your job conditions, LeTourneau offers you a choice of 4 two-wheel prime-movers, 122 to 450 h.p., with speeds up to 40 m.p.h. Each prime-mover powers from 3 to 5 interchangeable trailing units. Interchangeable haul units can be purchased any time. Wheels, tires, and brakes of trailing units are interchangeable, therefore, cost of an additional haul unit is only about 25% of the total initial cost of prime-mover and original haul unit. Whenever and wherever the need develops, a relatively small investment equips you to handle efficiently any specialized hauling, excavating, or lifting operation. Investigate the LeTourneau unit that fits your present equipment needs. Remember that with LeTourneau's wide range of applications, you always have a better opportunity for *continuous* equipment earnings, not only in your own pit, but through subcontracts, rentals or resale.

FOR SCRAPER DIRT

7 to 42-yd. Tournapull*

With scraper coupled to your prime-mover, you can strip overburden, move spoil banks, build and surface haul roads. Big low-pressure tires assure ample flotation in mud, sand and snow. Constant-pull, power-proportioning differential also reduces weather delays . . . gives positive traction on soft banks and slick pit grades . . . keeps your prime-mover working and earning all year 'round. Change from one hauled unit to another takes only a few hours. All units electrically controlled . . . use same wheels, tires, and brakes.



10 to 50-ton Flat-Bed

Tournahauler has plenty of power and traction for rough off-road hauling . . . can self-load and unload by means of optional traveling overhead electric hoist.**

10 to 40-ton Crane

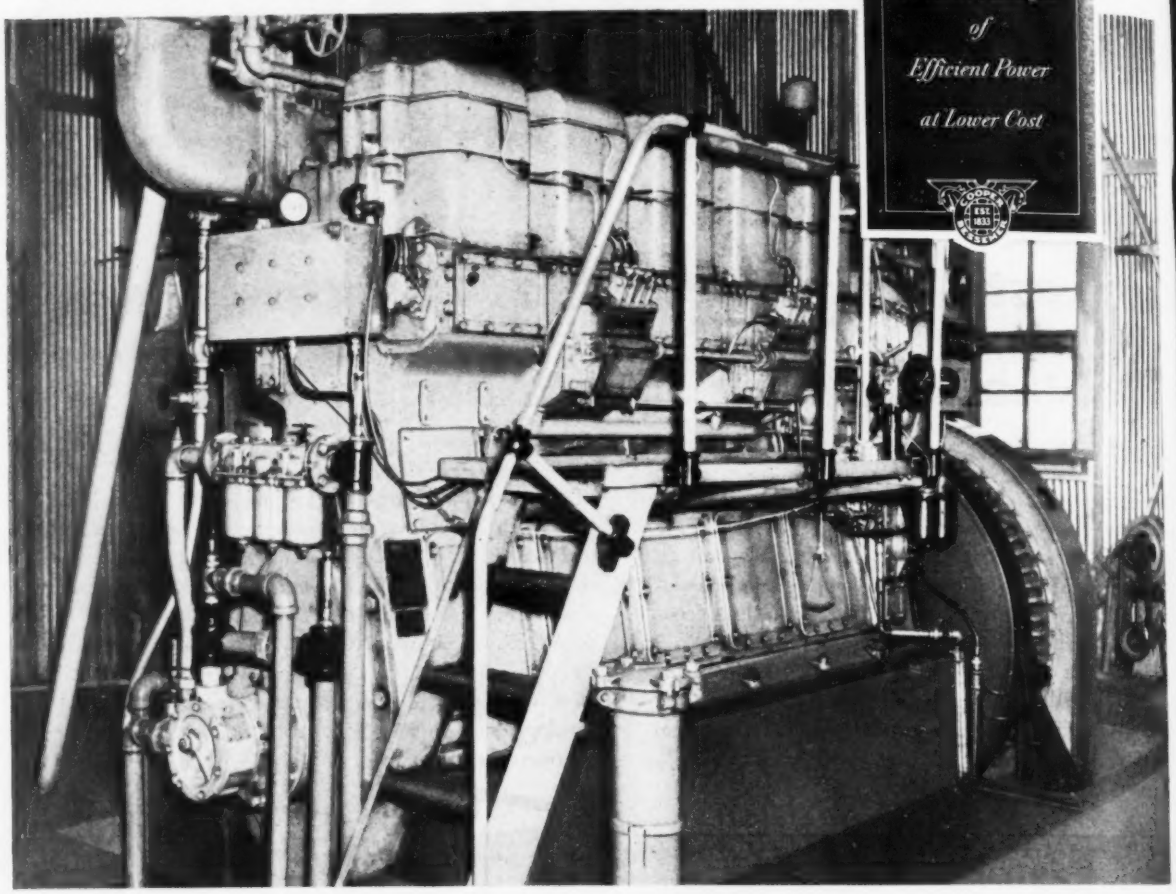
Works in buildings, on pavement, in mud, sand, or snow. Carries full load anywhere at high speeds . . . reaches through doorways, arches.

* Trademark Reg. U. S. Pat. Off. ** Trademark G-108-G

Company PEORIA, ILLINOIS

Installed at Uvalde Rock Asphalt Company's quarry, Blewett, Texas, this 430 hp Cooper-Bessemer JS-5 diesel drives a 300 kw generator for general power requirements.

Another Example of Efficient Power at Lower Cost



Steady worker, good at keeping costs DOWN!

THE Uvalde Rock Asphalt Company, which produces about 500,000 tons of limestone rock asphalt a year, needed a diesel that would stand up to steady work month in, month out. And that's just what they have in the Cooper-Bessemer JS-5 shown above. This efficient, husky diesel, installed in 1946, has done a steady job right from its initial start, with a very minimum of attention and replacement parts. Like other Cooper-Bessemer engine types, larger and smaller, the JS consistently shows records of low-cost operation. It has all the Cooper-Bessemer features that pay off every time.

When it comes to power for ANY heavy-duty service . . . or compressors to meet your air needs . . . you'll be money ahead with modern, trouble-free Cooper-Bessemers on the job. Descriptive bulletins are yours for the asking.

The Cooper-Bessemer Corporation

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

New York Washington, D. C. Bradford, Pa. San Francisco Houston, Dallas, Greggton, Pampa and Odessa, Texas Seattle Tulsa Shreveport St. Louis Los Angeles Chicago Caracas, Venezuela Cooper-Bessemer of Canada, Ltd., Halifax, Nova Scotia Gloucester, Mass. New Orleans, La.

Setting the Pace For TACONITE PROCESSING

World's Largest CRUSHER

THIS GIANT 60 x 109 gyratory crusher now being built in Allis-Chalmers shops will be capable of crushing 3500 tons of low grade iron ore an hour!

It is one of many contributions made since Allis-Chalmers first started the development of equipment for processing taconite ore . . . in the laboratory . . . in the pilot plant . . . and in actual operations on the iron range.

Other metallic ore producers, too, have looked to Allis-Chalmers, *world's most experienced manufacturer of processing equipment,* for crushers, grinding mills, screens and smelting machinery. Allis-Chalmers leadership assures you of equipment recommendations backed by *unsurpassed* experience in all phases of processing.

You'll find the A-C representative in your area a helpful consultant on your processing problems. Call him, or write Allis-Chalmers, Milwaukee 1, Wisconsin, for more facts.

A-3998

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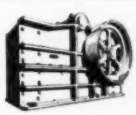
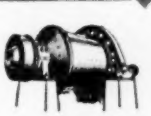
Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

Hammermills

Vibrating Screens


Jaw Crushers

Gyratory Crushers


Grinding Mills

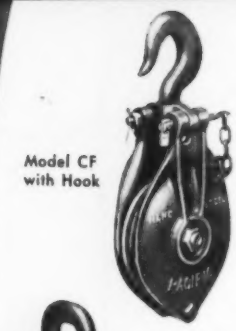
Kilns, Coolers, Dryers

YOU GET MORE FOR YOUR MONEY in PACIFIC SHEAVE BLOCKS

★

TYPES AND SIZES TO SUIT EVERY MINING OPERATION

Read the pull-out captions on this cutaway view and you'll see why PACIFIC Quick-Opening Sheave Blocks offer you more for your money. Manganese steel sheaves, manganese steel side frames—work-harden for longer wear. Sheaves are kind to cable. Side plates stand up. Upkeep is nil. Load rated roller bearings for extra safety. Special grease seals. Send for Bulletin No. 238.



Model CF with Hook

Model CF with Shackle

Model C with Safety Swivel Shackle

Model 6WT with Shackle

All blocks equipped with chained toggle pin for quick-opening.

Wide throat passes fittings, splices or square knots.

Manganese steel side frames work-harden with use. Practically impossible for cable to cut through.

Sheave rims are recessed into side frames to prevent rope fouling.

Manganese steel sheaves work-harden with use. This reduces cable wear.

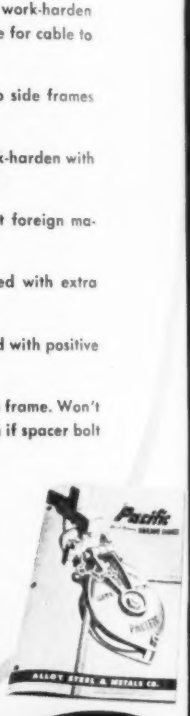
Special grease seal keeps out foreign material, keeps grease in.

Roller bearings are load-rated with extra high safety factor.

Shaft and bearings assembled with positive shake-proof lock washers.

Spacer is integral part of side frame. Won't collapse against sheave, even if spacer bolt is lost.

Send for Bulletin No. 238 which gives specifications on the complete line of PACIFIC Sheave Blocks. Bulletin also illustrates and describes PACIFIC Sheave Anchors.



Model C (half shroud) and Model CF (full shroud) furnished in 8″, 10″ and 12″ sizes. Available with hook, shackle or safety swivel shackle. ★ Pacific 6WT Wide Throat Carrying Block available with shackle or hook. Toggle pins included as standard equipment. ★ ALLOY also manufactures 19″ Tail Block Assemblies and 6″ Standard General Utility Blocks (not illustrated).

ALLOY STEEL & METALS CO.

1848 EAST 55TH STREET, LOS ANGELES 58, CALIFORNIA

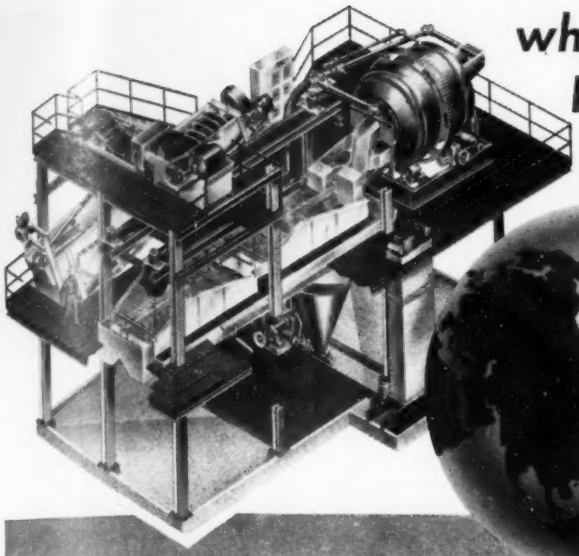
Mailing address:

Box 15323 Vernon Station, Los Angeles 58, Calif.

Be specific — Order PACIFIC

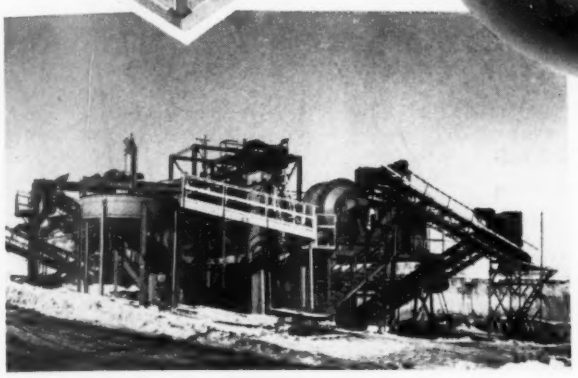
Jaw Crushers, "Slushmaster" Scrapers, Round-the-Corner Sheave Blocks, Bit Knockers and Wearing Parts.

ALLOY STEEL & METALS CO.



when you consider HEAVY MEDIA SEPARATION remember:

OVER 50% of all HMS PLANTS are WEMCO MOBIL-MILLS



Approximately 185 Heavy-Media plants have been placed in operation or are under construction throughout the world. Of these, 100 are Wemco Mobil-Mills located in 18 states and 15 foreign countries and having an aggregate rated capacity of **50 million** tons annually. Here is remarkable proof of Wemco's design know-how and extensive experience in the Heavy-Media Separation field.

Consistent, economical concentration of ores amenable to Heavy-Media Separation is offered by the Wemco Mobil-Mill. The superior design of this unit gives accurate control of media density and positive sink removal. It assures higher grade concentrate and lower tailings with operating costs as low as 15 cents per ton of feed. A partial list of ores being efficiently treated by Wemco Mobil-Mills includes:

LEAD	**COPPER**	**MANGANESE**
ZINC	**DOLOMITE**	**COAL**
IRON	**BARITE**	**AGGREGATES**
FLUORSPAR	**BRUCITE**	**DIAMONDS**

CUSTOM BUILT PLANTS

Wemco's extensive engineering and equipment experience is your assurance of our ability to design and install complete custom built beneficiation plants for any type mineral amenable to concentration by Heavy-Media Separation.

RENT OR PURCHASE WEMCO MOBIL-MILLS

Take advantage of Wemco's rental, rental/option to purchase, or outright purchase plans.

Write today for Bulletin M-3-M-5 and further information on the use of Mobil-Mills in mineral engineering practices.

OTHER WEMCO PRODUCTS

Mobil-Mills • HMS Thickeners • HMS Pumps • Cone Separators • Coal Spirals Sand Pumps • Drum Separators • Dewatering Spirals • Fagergren Laboratory Units • HMS Laboratory Units • Agitators • Hydroseparators • S-H Classifiers Thickeners • Conditioners • Fagergren & Steffensen Flotation Machines • Densifiers

WEMCO

WESTERN MACHINERY COMPANY

760-766 FOLSOM STREET · SAN FRANCISCO 7, CALIFORNIA

PRINCIPAL OFFICES

San Francisco • Sacramento • Salt Lake City • Spokane • Denver Pocatello, Idaho • Phoenix • Chicago • Hibbing, Minnesota New York • Jeffersonville, Indiana • Toronto, Canada

EXPORT DISTRIBUTORS

- Fraser & Chalmers (S.A.) Ltd., P.O. Box 619, *Johannesburg, South Africa*
- Lilestone & Co., Inc., P.O. Box 3368, *Manila, Philippines*
- United Development Corporation Pty. Ltd., P.O. Box 3460, *Sidney, N.S.W., Australia*
- Corporation Commercial Sudamericana S.A., *Casilla 505, Lima, Peru*

Check these important MOBIL-MILL features

- **Prefabricated, ready to install.**
- **Fast installation at the plant site.**
- **Minimum initial and operating costs.**
- **Clean separation, higher recovery.**

Mobil-Mills are furnished in five basic sizes and several models with smaller or larger plants varying in capacity from 5 to 275 TPH. Each plant is equipped with a choice of one of the following type separators to meet your particular requirements:

1. **WEMCO SINGLE DRUM** gives positive sink removal and efficient control of media density for one stage separation over a wide range of size fractions.
2. **WEMCO TWO-COMPARTMENT DRUM** gives two stage separation in a single unit for treating ores having a middling component.
3. **WEMCO CONE SEPARATOR** gives efficient, low cost separation with ores where a finer range of feed sizes requires greater volume of medium.

Stoody Alloys save shovel parts!

Hard-Facing restores life at a fraction of new part cost!

You can get new and longer life from worn shovel parts by hard-facing with Stoody Alloys! Cost of reclamation is far less than for new parts. Regular maintenance procedures thereafter save costly down-time, spare parts inventory and needless replacements.

Check your shovels today against the suggested rebuilding operations pictured at the right. Detailed manual procedures are described in the new revised STOODY GUIDEBOOK. Get it from your Stoody dealer or by mail.

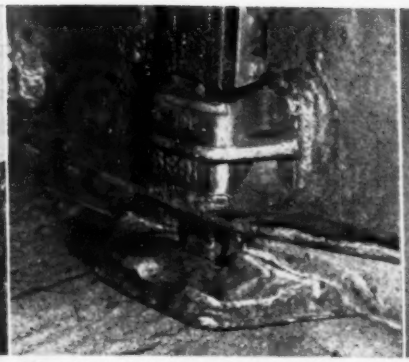
Custom welding shops equipped to handle automatic rebuilding work are located in every section of the United States and Canada. Write for list of shops near you.

1 BUCKET TEETH, LIPS, SIDES, BOTTOMS

ALLOY: *Stoody Self-Hardening 21 or Stoody 1027.*

APPLICATION: *Manual—stringer beads or solid overlays on wear areas.*

RESULTS: *Maintains size, reduces wear, retains full bite and load.*



2 LATCH PLATES AND KEEPERS

ALLOY: *Stoody Self-Hardening or Stoody 1027.*

APPLICATION: *Manual—build to size and peen to shape while red hot.*

RESULTS: *Effects positive latch closure. Negligible cost.*

3 SHEAVES

ALLOY: *Stoody 104 or Stoody 107.*

APPLICATION: *By automatic—machinable deposit.*

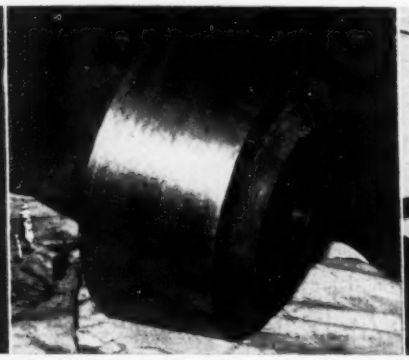
RESULTS: *Prevents grooving, increases rope life.*

4 HOUSE BASE RINGS

ALLOY: *Build up with Stoody 104, finish with Stoody 107.*

APPLICATION: *By automatic—machinable surface.*

RESULTS: *Reclamation ¼ of new ring cost.*

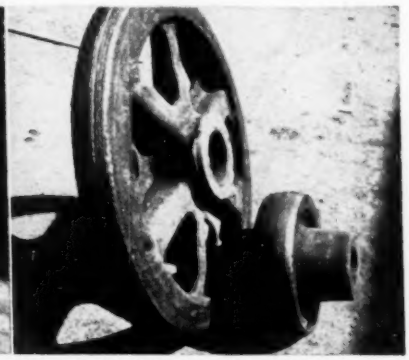


5 HOUSE ROLLERS

ALLOY: *Stoody 107.*

APPLICATION: *By automatic—machinable surface.*

RESULTS: *Restores contour, doubles life at 1/3 the cost.*



6 SHOVEL IDLERS AND ROLLERS

ALLOY: *Stoody 105.*

APPLICATION: *By automatic—no finishing necessary.*

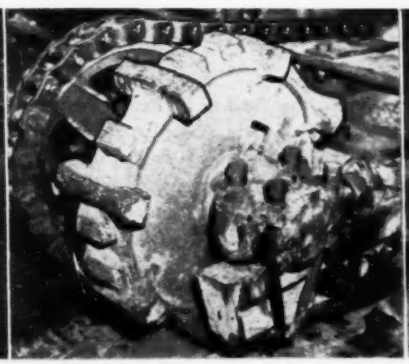
RESULTS: *Restores wearing faces, doubles life at ½ original cost.*

7 TRACK PADS

ALLOY: *Stoody 1027.*

APPLICATION: *Manual—rebuild with Stoody High Carbon, overlay with Stoody 1027.*

RESULTS: *Doubles life at ½ cost.*

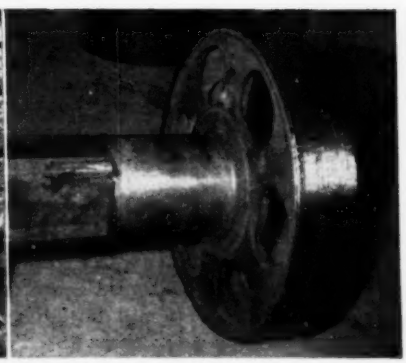


8 DRIVING TUMBLERS

ALLOY: *Coated Stoody Self-Hardening or Stoody 1027.*

APPLICATION: *Manual—rebuild drive lugs.*

RESULTS: *Doubles life at ½ original cost.*



9 SWING BRAKE DRUMS

ALLOY: *Stoody 106.*

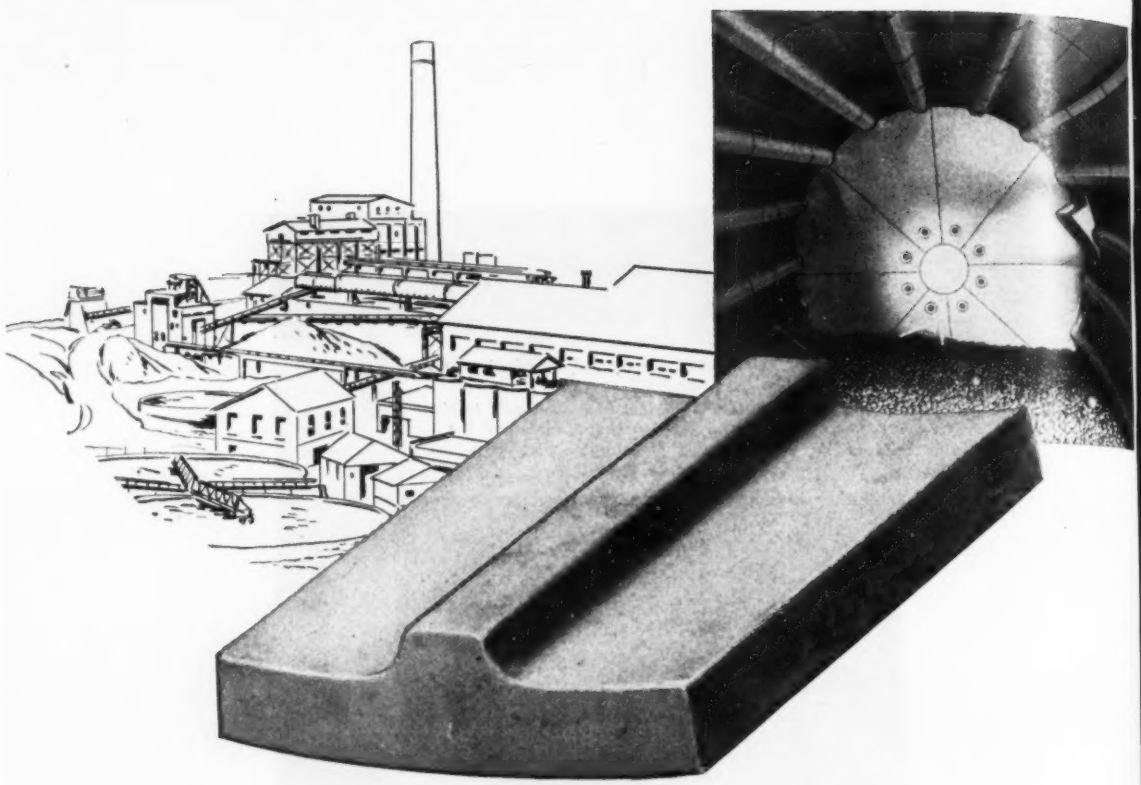
APPLICATION: *By automatic—machine to finish.*

RESULTS: *Illustrated type reclaimed for 15% of new cost, outlasts new drum.*

See the "yellow pages" in the phone directory for your local Stoody dealer, or write for dealer list and complete literature

STOODY COMPANY

11969 E. SLAUSON AVENUE, WHITTIER, CALIFORNIA



this LINER boosted production 35%

AMSCO Ball Mill Liners

Reduced Down-Time, Increased Production...

A large West Coast cement producer found that Ball Mill Liners were causing expensive trouble. Liners were thick—*over 3 inches.* This meant reduction in mill capacity. Thick liners also meant tremendous weight. Both thickness and weight reduced production and efficiency. *Liners wore rapidly,* too, causing frequent, expensive replacement jobs, with costly labor and material. And added to the bill was lost production due to mill down-time.

Well-known for their skill in handling impact and abrasion-resistant alloys, AMSCO engineers and foundrymen were consulted.

AMSCO solved the Ball Mill Liner problem.

AMSCO designed a new, light, thin—*1 inch thick*—liner, which because of lightness and thinness increased mill capacity, heightened efficiency. The new liners lasted beyond all expectations and in addition the segments were easier to install. These factors, plus reduced replacement down-time, have been responsible for a *35% increase in production.*

AMSCO is the largest producer of Manganese Steel, "the toughest steel known," which has proven itself under countless abrasion and impact situations. And where the service conditions require it, AMSCO also produces Chromium-Molybdenum and Chrome-Manganese alloys.

If you have a tough wear problem and suspect that there may be a better alloy for your purpose, you are invited to write to AMSCO for further information.

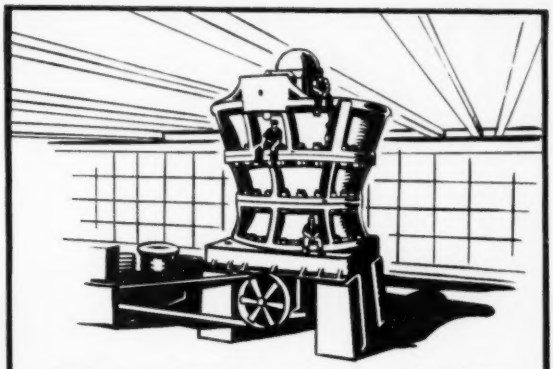
AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION

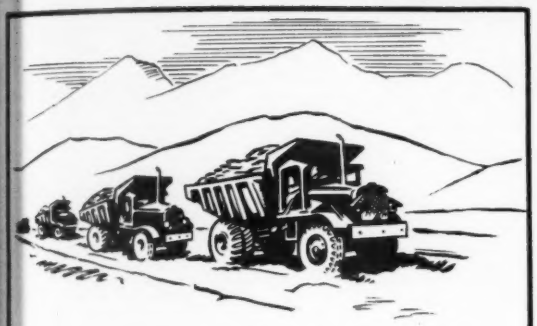
425 EAST 14th STREET · CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que.
Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

Ten Years of hard labor



Look at the production record of one 60" Traylor Bulldog Gyratory Crusher installed in 1942. This is a record of 10 years of hard labor.



Now over 10 years old, this Traylor TC is producing 3984 tons per hour of 6" ore. To date, it has crushed 119 MILLION TONS of ore.

Your slide rule will tell you this Traylor crusher had to work an average of over 8 hours a day, 7 days a week, 52 weeks a year, for 10 consecutive years to make this record . . . which is exactly what it did.

A **Traylor** LEADS TO GREATER PROFITS

Production records like this have been set by Traylor TC Gyratory Crushers all over the world. They will set new production records for you, too. For complete details of exclusive design features that enable a Traylor to increase your production . . . at a profit . . . send for your copy of Bulletin 126.

Name: _____

Position: _____

Company: _____

Address: _____ State: _____

TRAYLOR ENGINEERING & MFG., CO.

1523 MILL ST., ALLENTOWN, PA.

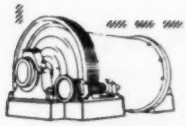
SALES OFFICES: New York • Chicago • San Francisco

Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P.Q.

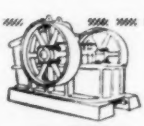
Primary Gyratory Crushers

Rotary Kilns

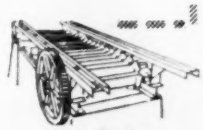
Secondary Gyratory Crushers



Ball Mills



Jaw Crushers



Apron Feeders

"You people make lots of sheet steel— *where's it all going?"*

Yes Mr. Buyer, our industry *is* turning out lots of sheet steel. But, now, at just the time when civilian needs for sheets are greater than ever, defense needs are great, too. So, a lot of sheet steel that normally would go into civilian channels must be used instead to meet defense requirements.

Columbia-Geneva is doing its best to help overcome the shortage of sheets, but still cannot begin to fill all orders. It is hoped, though, that it will not be too long before we can supply a much greater tonnage to our civilian customers.

In the meantime, please remember that – no matter what the supply situation–Columbia-Geneva sheets remain unchanged in their high quality. From raw ore to finished product, the quality of Columbia-Geneva steel sheets is rigidly controlled by metallurgists and other trained technical personnel using the most advanced testing methods; from start to finish, Columbia-Geneva sheets are produced in the most modern mills in the West; at every step of the way they are designed to meet your most exacting specifications.

That's why sheet steel from Columbia-Geneva is always your best buy. And we hope that as more becomes available, you'll continue to look first to Columbia-Geneva, the West's largest steel producer.

U·S·S Steel Sheets

COLUMBIA-GENEVA STEEL

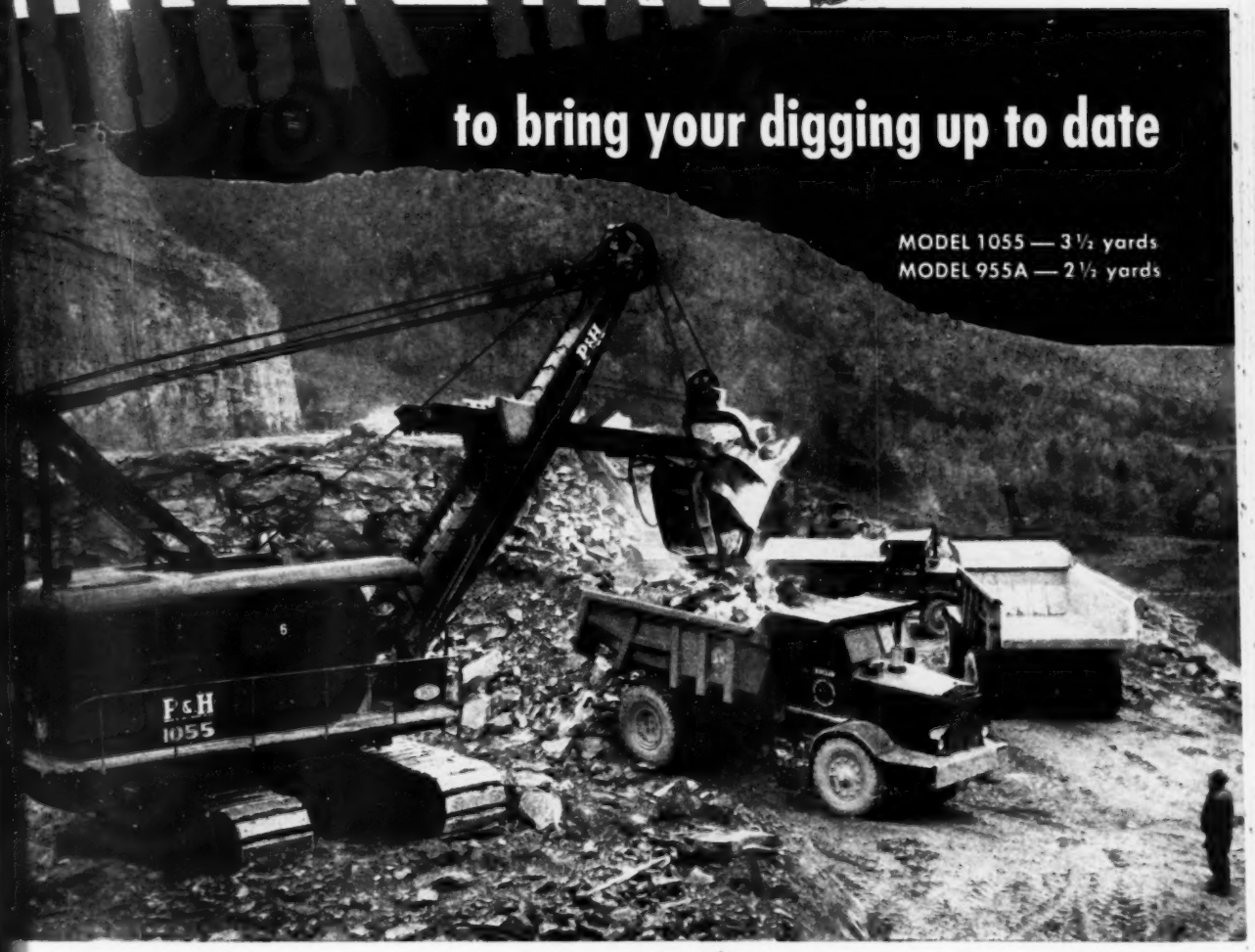
Division United States Steel Corporation, San Francisco

UNITED STATES STEEL

ROCK RATED

to bring your digging up to date

MODEL 1055 — 3½ yards
MODEL 955A — 2½ yards



You have the jump on costs when your new P&H takes over the tough digging jobs. Why? Because there's no other machine to match its performance. You have the speed — a 15% to 25% faster digging cycle — for bigger production. You have the all-welded strength to take shock loads that would K.O. less rugged machines. You have the stability to exert more power at the tooth point. That gives you added capacity.

If you're ready to cut your costs, these P&H's are ready to help you.

P&H MAGNETORQUE*
ELECTRIC SWING

the greatest shovel improvement in 20 years. It's smoother, faster, more dependable. It eliminates the old swing frictions with their constant headaches and replacement costs. Magnetorque lasts the life of your machine. You should know the facts about it!

**T.M. of Harnischfeger Corporation for electro-magnetic type coupling.*

P&H LARGE EXCAVATOR DIVISION
HARNISCHFEGER CORPORATION
MILWAUKEE 46, WISCONSIN

P&H Line

GARDNER-DENVER
is first again!

now it's the "Blast Hole" drill designed especially for percussion deep hole drilling

the NEW Model SFH99

A Natural Partner — with Carbide Bits and Superior Gardner-Denver Alloy Sectional Rods and Couplings — for Low Cost Blast Hole Drilling.

Permits a 4' change in a 7' drift—saves time and development work.

Superior chuck construction—1½" x 3 13/16" shank rod locked in chuck—results in longer life for hammer, tube, chuck, shank rod and ring seal.

Locked-in shank rod prevents loss of rod string on down holes.

Heavy-duty centralizer supports rod string during rod changes—simplifies up-hole drilling.

Reverse rotation and locked-in shank rod enable operator to uncouple rods quickly and easily—using power from the drill and only one wrench.

Delivers high-pressure water or air through chromium plated tube and Ring Seal Shank.

Lightweight aluminum alloy guide shell—reversible for extra life. Movable cone.

Write today for complete details.

SINCE 1859

GARDNER-DENVER

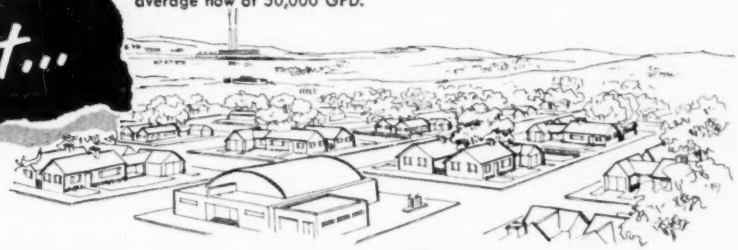
Export Division: 233 Broadway, New York 7, N.Y., U.S.A.

Gardner-Denver Company, Quincy, Illinois, U.S.A.

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS
FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

to solve the problem of townsite sewage treatment...

This Dorr Clarigester provides complete sewage treatment for a population of 500. Because a full time operator is not available, the installation is set up to operate with minimum maintenance and attention. The 14' dia. Dorr Clarigester, in conjunction with other equipment required for this job, has an average flow of 50,000 GPD.



get the facts about the Dorr Clarigester

Ideally suited to the needs of mining towns, the Dorr Clarigester offers a low cost and consistently dependable method for solving sewage treatment problems.

Available in sizes from 12 to 40 feet dia., the unit combines a Dorr Clarifier mechanism in the upper compartment with a Dorr Digester in the lower. This "two-in-one" packaged unit provides all the advantages of the Imhoff tank . . . yet eliminates floating scum, lack of control and costly construction.

Because of its completely mechanical action, the Clarigester gives compact and highly efficient operation. Clarification and scum removal take place in the upper compartment, homogeneous digestion and sludge collection in the lower compartment. A special one-way seal prevents the passage of gas or sludge liquor upward. Heating coils may be installed to promote optimum digestion temperatures with hot water usually supplied by a small boiler.

Write for Bulletin #6691-C containing more information, or better still, let a Dorr engineer explain the Clarigester to you . . . in terms of your own problem.

CLARIGESTER is a trademark of The Dorr Co., Reg. U. S. Pat. Off.

Better tools TODAY to meet tomorrow's demand

DORRCO

DORR

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

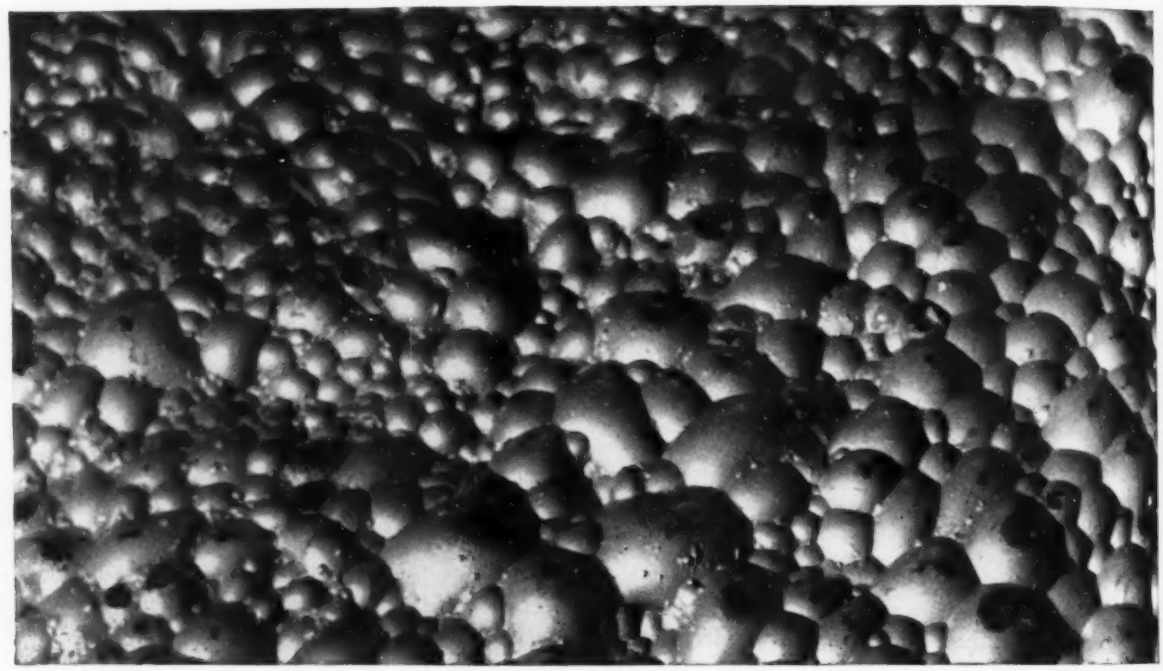
THE DORR COMPANY • ENGINEERS • STAMFORD, CONN.

Offices, Associated Companies or Representatives in principal cities of the world.

DOW

DOWFROTH 250, AN IMPROVED FROTHER AT LOWER COST

DOW'S quality frothing agent raises concentrate grade—increases recovery—with reduced frother consumption!



In many mills today, Dowfroth* 250 is producing improved metallurgy with as little as one-fourth the consumption of previous frothers used. This translates into increased profits and substantial savings in your mill operation.

Dowfroth 250 is easy to use, too . . . it requires minimum conditioning time for stage addition; its water solubility permits accurate regulation as a water solution, if desired; and it demonstrates little or no collecting power, allowing you freedom to regulate frother and collector independently.

As a pioneer producer of Xanthates, Dow has built up extensive facilities for the manufacture of flotation agents, assuring you adequate supplies of Dow Xanthates and Dowfroth 250 of dependable high quality at all times.

Prove, in your own mill, the economy and efficiency of Dowfroth 250. For a test sample of this dependable frother, write to THE DOW CHEMICAL COMPANY, Midland, Michigan, *Dept. OC 3-40.*

*Trademark

you can depend on DOW CHEMICALS DOW

here's muscle to move mountains | IN 6 YARD BITES!

LIMA TYPE 2400—The largest member of the Lima family is engineered and constructed for heavy duty service with higher dump, greater reach, and faster digging cycle.

EASY INSTANT CONTROL — Smooth, "Precision" air control of travel and operating motions lessens operator fatigue. Anti-friction bearings, reduce power robbing friction and step up efficiency.

BIG YARDAGE PRODUCER— Maximum power and fast digging cycles originate from a husky 12 cylinder Diesel engine of approved make. Equipped with torque converter power take-off.

LOW OPERATING COSTS — Truck and rotating bases are integrally cast for extra-rigidity and long life. Adjustments rarely needed on full mechanical clutches. Easy maintenance.

Offices in Principal Cities of the World

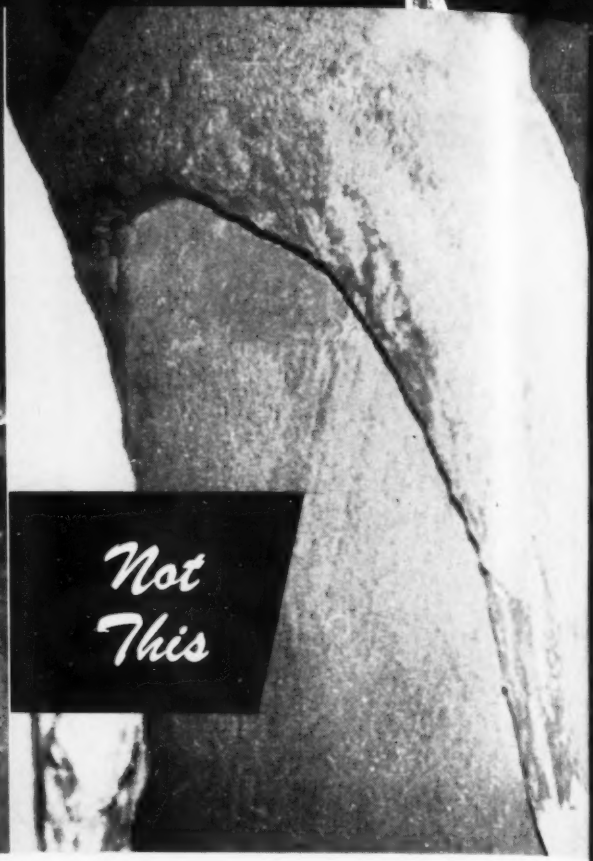
Cable Address: LIMASHOVEL

LIMA

SHOVELS • CRANES
DRAGLINES • PULLSHOVELS

BALDWIN-LIMA-HAMILTON CORPORATION
Construction Equipment Division
LIMA, OHIO, U.S.A.

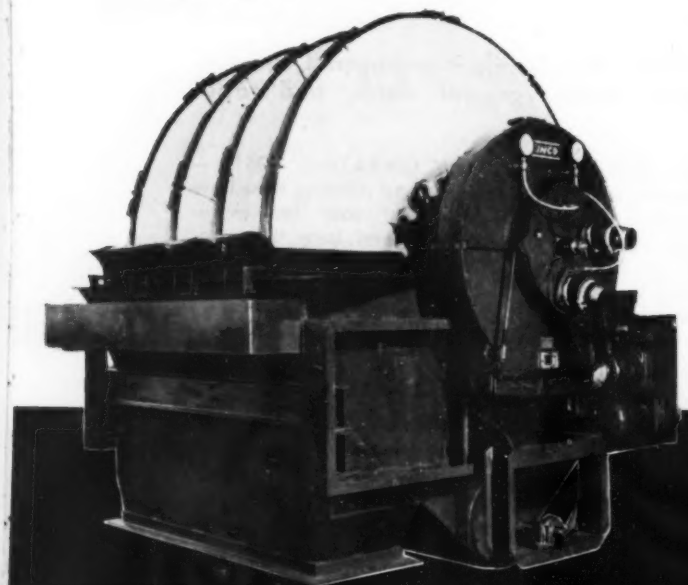
Construction Equipment Division



ELIMINATE "CLASSIFICATION RING"

The "Classification Ring" or heavy solids deposited on the periphery of the disc is caused by pick up at the bottom of the tank of the greater concentration of heavy solids settling in that area.

This cake formation can be eliminated and evenly distributed cake over the entire surface of the sector for better drying, greater tonnage and longer bag life.



Numerous tests have proved that the use of Eimco Agidisc filters in metallurgical slurries has reduced moisture content of cake and increased production and filter bag life.

The illustrations above show two filters operating simultaneously side by side in the same plant, on the same feed. The filter on the left shows smooth, evenly distributed cake as a result of Eimco engineered Agidisc construction fitting a special application to a special job. The filter on the right is an ordinary disc filter.

Results in this plant showed 1½% less moisture content and 20% more tonnage on the Eimco Agidisc filter.

Write for more information on Agidisc filters for metallurgical slurries.

You Can't Beat an Eimco

EIMCO

THE EIMCO CORPORATION

The World's Leading Manufacturer of Vacuum Filtration Equipment

EXECUTIVE OFFICES AND FACTORIES — SALT LAKE CITY 10, UTAH, U. S. A.

BRANCH SALES AND SERVICE OFFICES:

NEW YORK, 51-52 SOUTH STREET • CHICAGO, 3319 SOUTH WALLACE STREET
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EL PASO, TEXAS, MILLS BUILDING • BERKELEY, CALIF., 637 CEDAR STREET
KELLOGG, IDAHO, 307 DIVISION ST. • LONDON W. 1, ENGLAND, 190 PICCADILLY

IN FRANCE: SOCIETE EIMCO, PARIS, FRANCE
IN ENGLAND: EIMCO (GREAT BRITAIN) LTD., LEEDS 12, ENGLAND

BUYING A MAGNET?

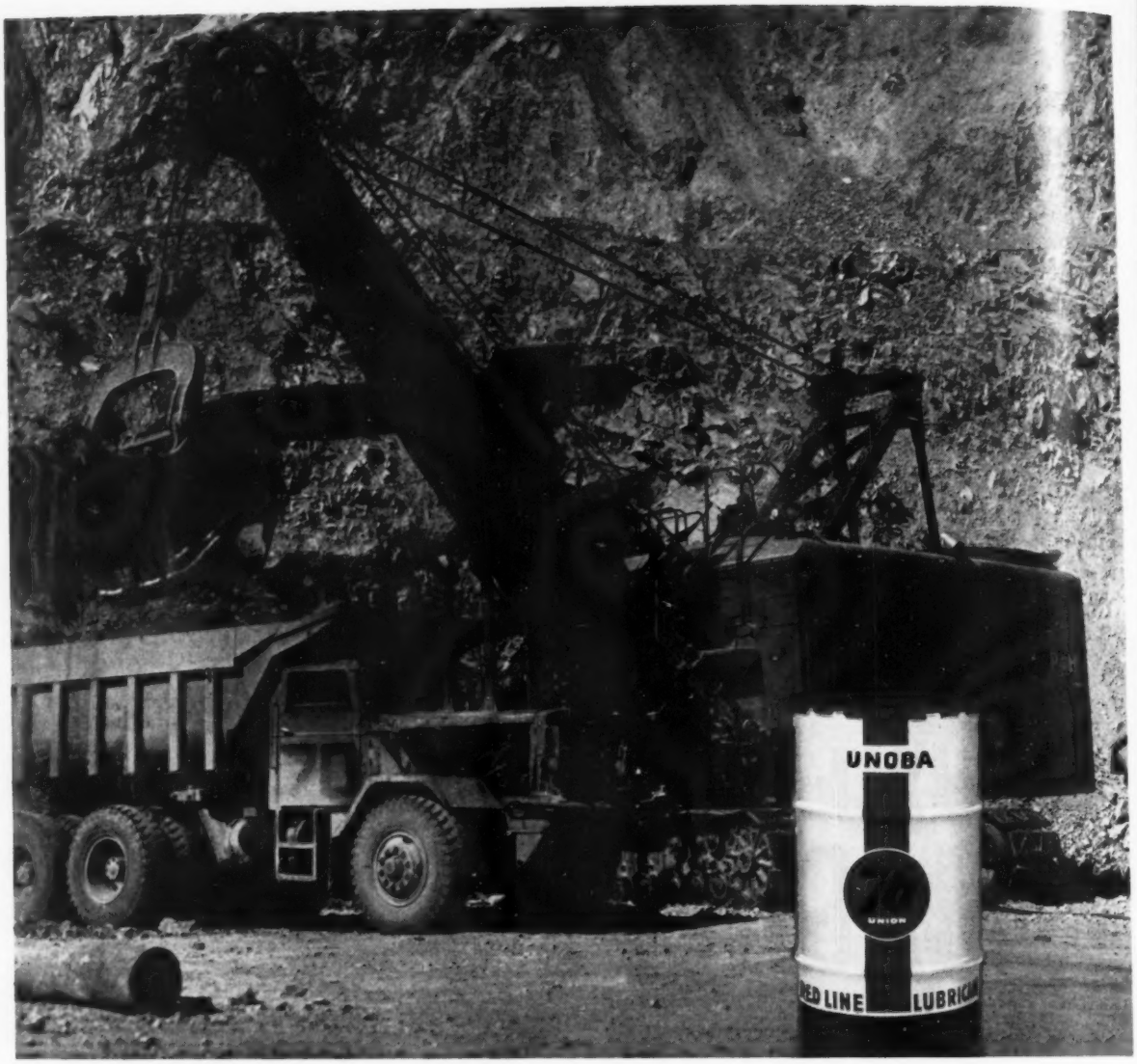
selecting the correct one can be a problem —

THE SERVICES OFFERED by the Dings Magnetic Separator Company simplify the problem of correct magnet selection. The expert advice of Dings Field engineers, and the complete facilities of the Dings Laboratories are available to any firm in need of them. They assure your getting the most efficient magnet, or a magnetic separator for the job you want done, whether it's purification, concentration, tramp iron removal, scrap separation, or materials handling. Dings makes equipment for all these applications. It's described in two free catalogs, B-1600-A and C-5000-B. Both will be promptly sent on request.

Dings EM 153

MAGNETIC SEPARATOR COMPANY

4719 W. ELECTRIC AVE., MILWAUKEE 46, WISCONSIN



How UNOBA Cushions a 4-Ton Punch

Every time this giant shovel trips its bucket, the truck below takes a four-ton punch. Rugged use of equipment like this requires a grease that can cushion the shock. And that means UNOBA.

UNOBA's tough coating sticks in spite of the hardest shocks. It eliminates excessive wear, cushions costly metal parts from damaging straining and grinding.

UNOBA also protects against rust, dust and corrosion. Even steam cleaning won't remove its tenacious protective film.

Save yourself time and money by switching to UNOBA, the original multi-purpose grease. UNOBA does the work of as many as seven greases... reduces the chance of using the wrong lubricant.

Your expensive equipment needs dependable multi-purpose UNOBA grease.

OFFICES: LOS ANGELES: Union Oil Building • NEW YORK: 45 Rockefeller Plaza • CHICAGO: 1612 Bankers Building
CINCINNATI: 2111 Carew Tower Building • NEW ORLEANS: 917 National Bank of Commerce Building

UNION OIL 76 COMPANY OF CALIFORNIA

UNOBA is made by the developers of DRILLUBE air drill lubricant. DRILLUBE offers high film strength lubrication...with no sickening drill fog.

LET REPUBLIC SUPPLY YOUR INDUSTRIAL NEEDS!

We said (to the customer on the other end of the phone): "Where are you located?" *He said:* "In the Pacific, about five fathoms deep." *We said:* "We'll send a man right down." *The moral:* Let Republic Supply your industrial needs.

Come diving bell or high water—wherever you are, whatever you do, you'll do better with Republic Supply's friendly, helpful service.

THE REPUBLIC SUPPLY COMPANY

Los Angeles Office — phone: UNderhill 0-2511; San Leandro — phone: LOckhaven 2-0414; Phoenix — phone: ALpine 4-3434
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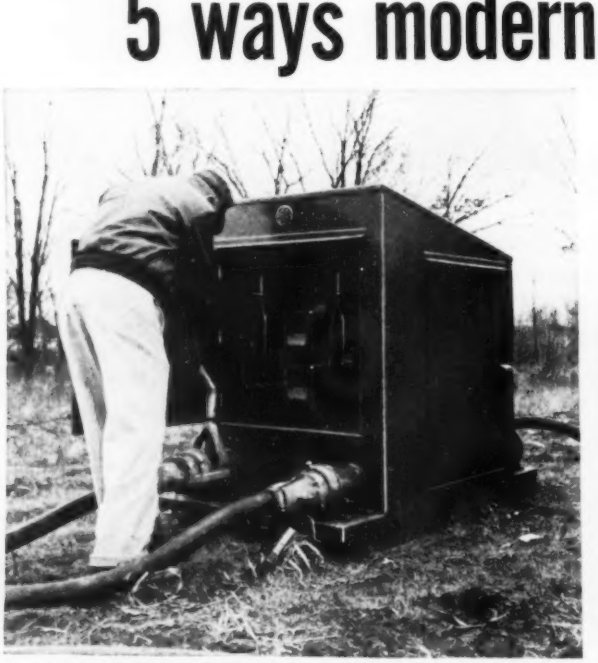
GE ENGINEERING REPORTS:

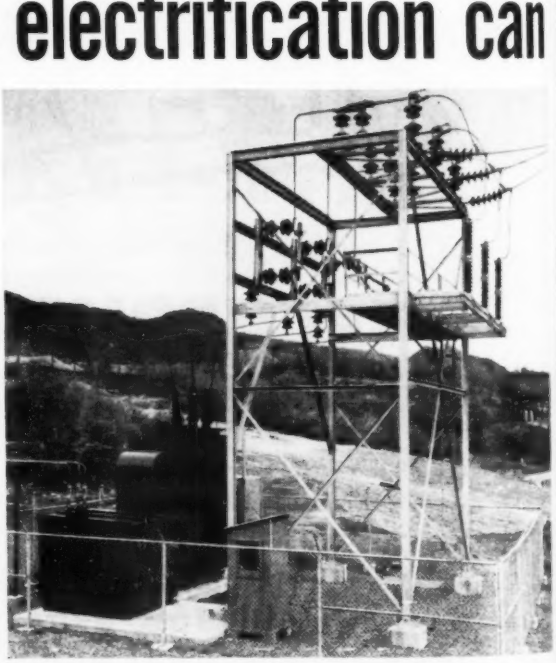
Photograph courtesy of Kennecott Copper Corporation

1 STEP UP SHOVEL SPEED, CAPACITY. This shovel performs faster, more smoothly, thanks to its simple, rugged G-E drive system. Usable torque is increased. Response and acceleration are improved. Amplidynes, which control shovel motions precisely, prevent excessive current and torque peaks which might damage electrical and mechanical equipment.

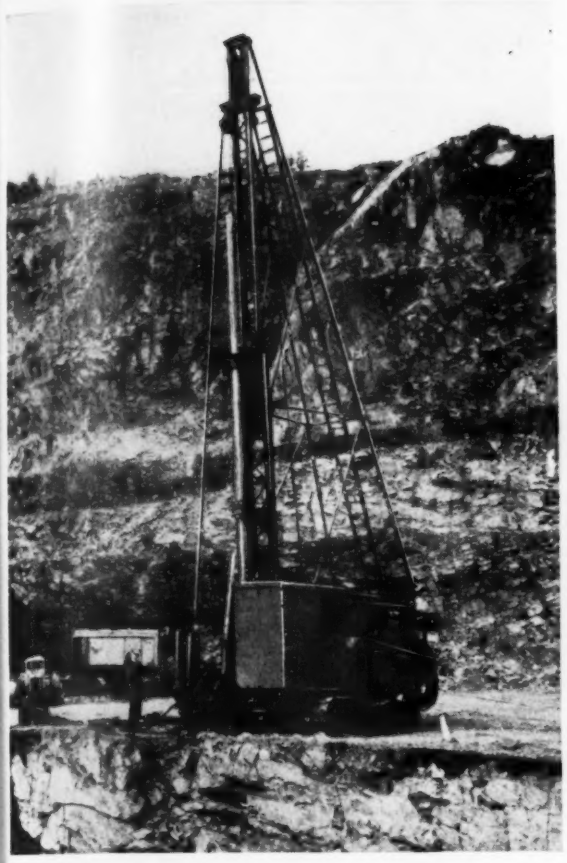
5 ways modern electrification can



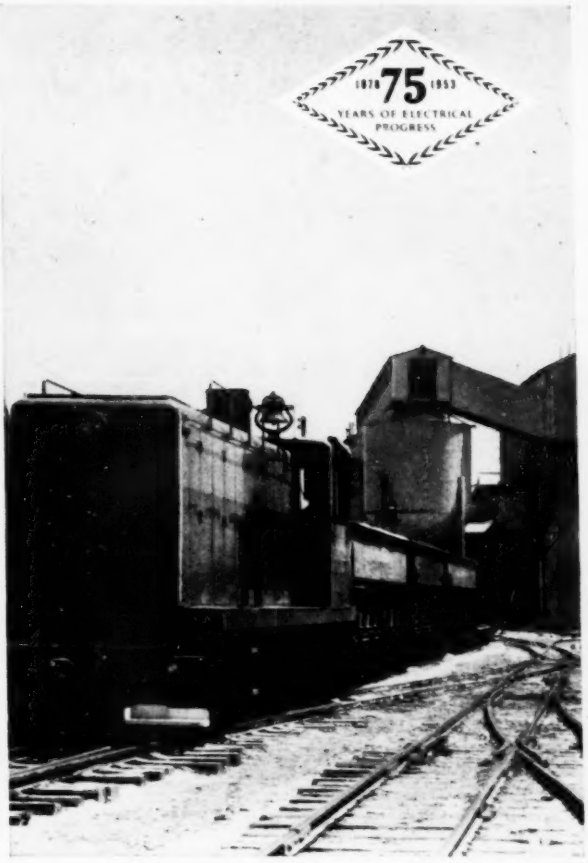
4 MAKE POWER SYSTEM MORE FLEXIBLE. This standard G-E cable-skid switch house has polarized couplers to simplify and speed up cable interchanging. Skid house is easy to move.



5 IMPROVE POWER SYSTEM PROTECTION. Magne-blast breakers in G-E master unit substation protect feeders. lightning arresters help guard substation against outage-



2 INCREASE DRILL FOOTAGE. This self-contained churn drill, powered by G.E., delivers rapid rock penetration—promoting more efficient drilling and blasting practices.



3 HAUL MORE ORE. General Electric 70-ton diesel-electric locomotive has high availability. It maneuvers rapidly, efficiently, helps speed all switching operations.

help you mine more tons per day

G-E engineered electrical systems mean faster open pit mining at less cost

You need speed, flexibility, and safety in your open pit mining operations if you are to meet present demands for higher production per man-day. ***Modern electric power*** is the key. Here's what it helps you to do.

1. You can speed up the digging cycle. G-E amplidyne-controlled drives provide faster hoist, swing, and crowd action on power shovels. Shovels work around the clock with minimum time lost for maintenance or repairs.

2. You can step up drilling efficiency. Modern rotary and churn drills, powered by General Electric, are self-propelled. Smooth, fast motor control helps them to drill harder rock at higher speeds.

3. You can haul greater tonnages. G-E diesel-electric locomotives withstand hard work cycles. Units can be operated close to the wheels' slipping point even with heaviest loads.

4. You can cut re-location time. G-E cable-skid switch houses give a more flexible power system arrangement. Moving is simplified. Cable connecting time is minimized.

5. You can increase mining efficiency and safety with portable G-E unit substations. They improve voltage levels—make full equipment capacity available. Distribution losses are reduced. Grounding systems help protect personnel and equipment.

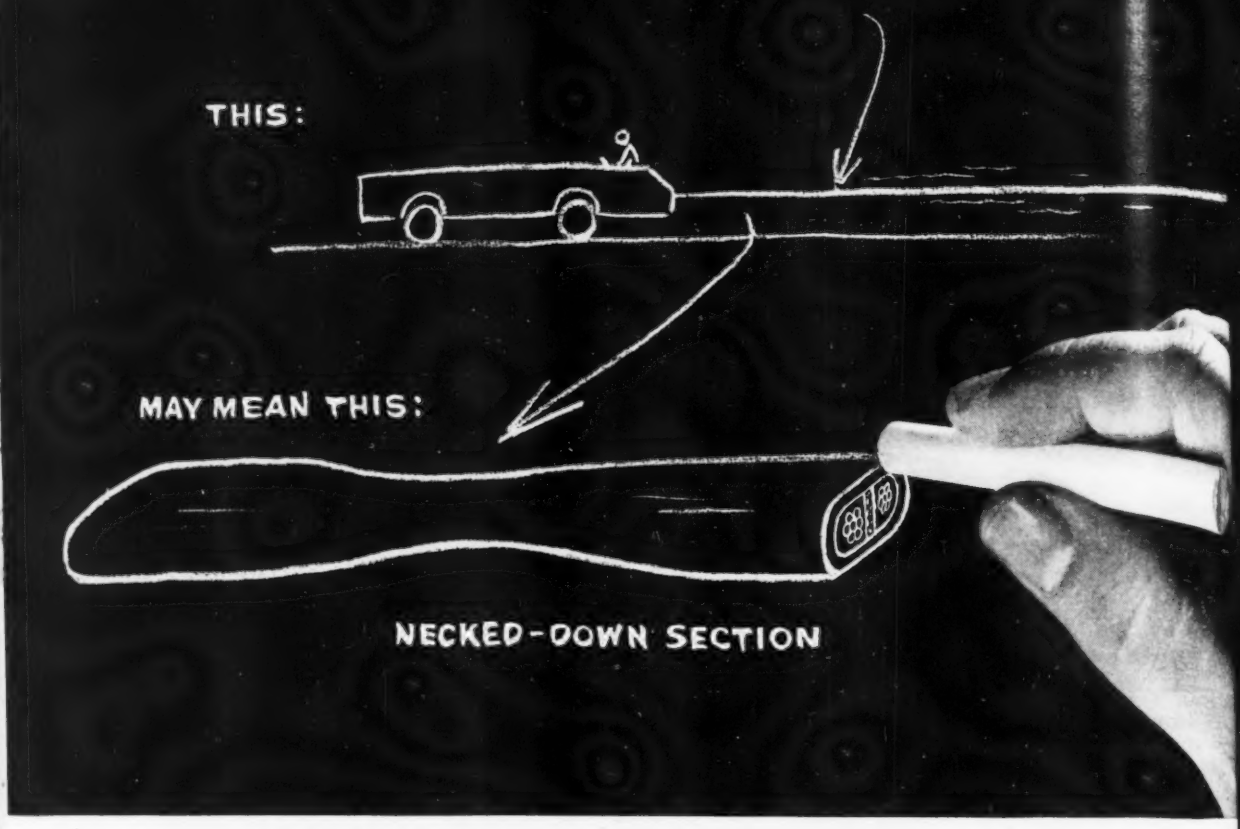
These production-boosting techniques can be applied to your surface mining operation. A G-E mining industry specialist can show you how. Contact him at your nearest G-E Apparatus Sales Office. General Electric Company, Schenectady 5, New York.

660-29

Engineered Electrical Systems for the Mining Industry

GENERAL ELECTRIC

HOW TO SPOT DAMAGE FROM TOO MUCH TENSION



. . . AND WHY ANACONDA'S NEW BALANCED DESIGN ADDS SAFETY, LONGER LIFE TO CABLE

Necked-down cable shows overstretching. Jacket and insulation become thin, easily punctured. Moisture penetration or a broken ground conductor may make the cable hazardous.

ANACONDA'S ANSWER: BALANCED DESIGN

Tension devices help; but aren't cure-alls. An added safeguard lies in the balanced design of Anaconda's new mining-machine cable. Stretchability of the ground has been increased. It will not break before the power conductors. A new neoprene jacket has higher compression-cutting resistance and tensile strength. In the insulation more strength and moisture resistance are obtained from a cold-rubber base . . . similar to that used by tire makers to mold a tougher tire. Stranding, too, has been redesigned to make the whole cable more flexible . . . at no greater cost. You get less trouble from tearing, cutting, gouging and abrasion caused by rib-pinching, runovers and dragging.

MUCH LONGER AVERAGE LIFE

In shuttle cars recently surveyed in 15 mines, ANACONDA Cables last 3 times as long as cables made only a few years ago. To learn why this is so, ask your nearest Anaconda Sales Office or Distributor for a sample section of this new cable. Examine it . . . take it apart. And remember that no ANACONDA Mine Cable has ever failed a U. S. Bureau of Mines flame test. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

ANACONDA®

TODAY'S HEADQUARTERS FOR MINE CABLE

STANDARD ENGINEER'S REPORT

LUBRICANT Calol Vistac Oil

UNIT Rock drill-Ingersoll-Rand drifter

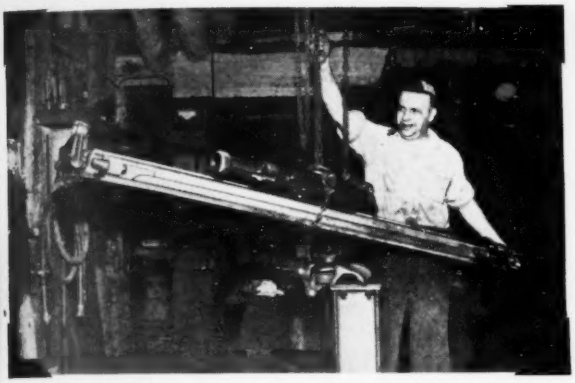
LUBRICATOR Line oiler

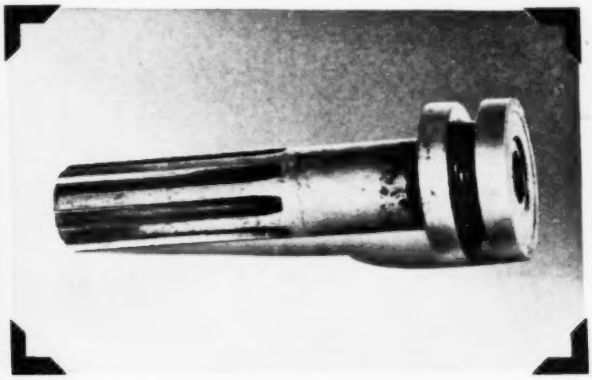
OPERATION Deep underground mining

CONDITIONS High humidity & temp.

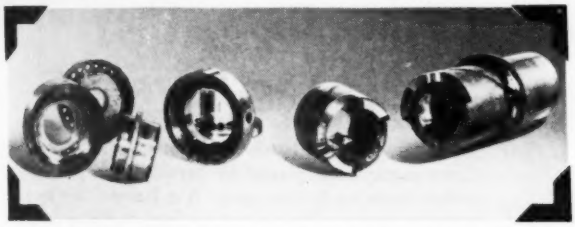
FIRM Sunshine Mining Co., Kellogg, Idaho

Only 0.001 wear on rock-drill piston in 120 shifts!





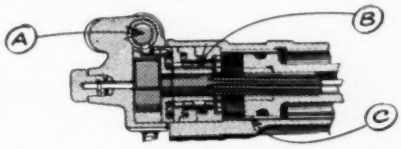
ON THE 3100-FOOT LEVEL of the famous Sunshine silver mine, this drifter, lubricated with Calol Vistac Oil, was in steady service for more than two months before coming in for service. When disassembled by "Drill Doctor" Dave Farnsworth, the piston "miked" only 0.001 inch wear despite the tough conditions in which the drill works. Working face is 400 feet below sea-level. Humidity is around 90 with atmosphere at a constant 75°F. After cleaning, the piston and other parts were put back in service.



VALVE-CHEST ASSEMBLY, chuck and chuck jaw from the drifter. Note the absence of lacquer or corrosion on air-valve parts. Because Calol Vistac Oil has held air-tool wear to the minimum and is approved by the miners, Sunshine Mining Co. has used it for more than 10 years.

REMARKS: Besides providing good air-tool lubrication without excessive vapor or bad odor, Calol Vistac Oil is excellent for heavy-duty plain bearings, reduction gears, motor gear heads, etc. It comes in several grades and may be applied by wick-, ring-, and drip-feed oilers.

How CALOL Vistac Oil cuts costs in air-tool equipment



A. Atomizes quickly and completely—carries evenly over all parts. Does not fog excessively and has no unpleasant odor.

B. Additives help form tenacious, oily, pressure-resistant film in wet or dry conditions—cuts wear and power loss. Small quantity lubricates efficiently.

C. Resists high temperatures and oxidation. Stays fluid at low temperatures.

FREE CATALOG: "How to Save Money on Equipment Operation," a new booklet full of valuable information, will be sent you on request to Standard Oil Company of California, 225 Bush St., San Francisco, Calif.

CALOL

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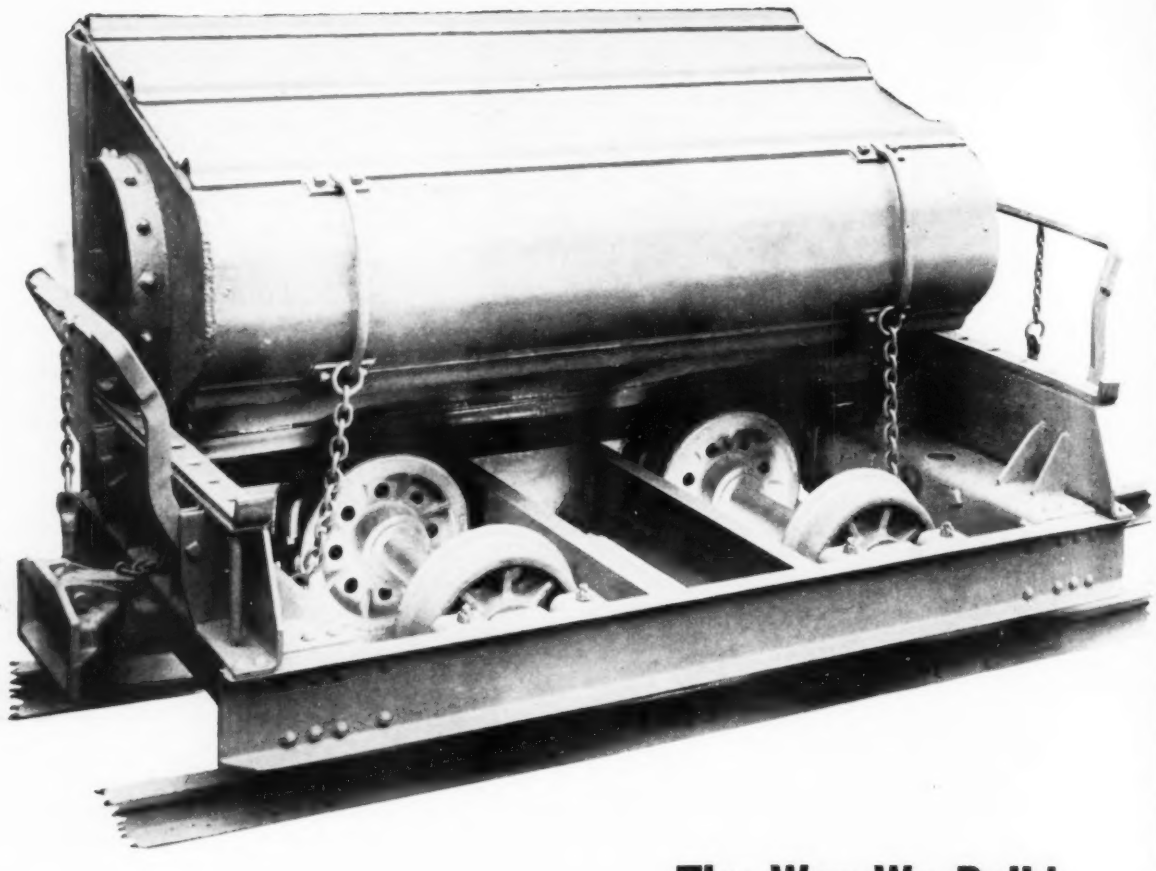
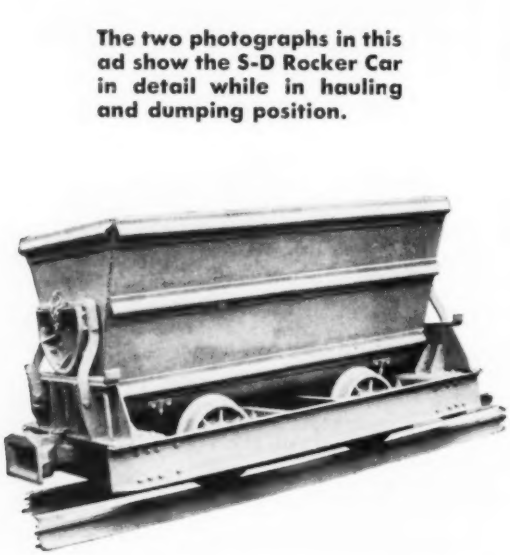


The two photographs in this ad show the S-D Rocker Car in detail while in hauling and dumping position.



The Way We Build Rocker Cars, They Should Last forever!

Nothing is overlooked to make S-D Rocker Cars your best possible buy for long life and minimum maintenance. We know the terrific punishment a Rocker Car has to take in service. We know that skimpy fabrication is false economy. Consequently, you'll find in S-D Cars extra welding . . . extra rivets and extra reinforcing where it should be . . . cars designed and built up to a service requirement, not down to a price.

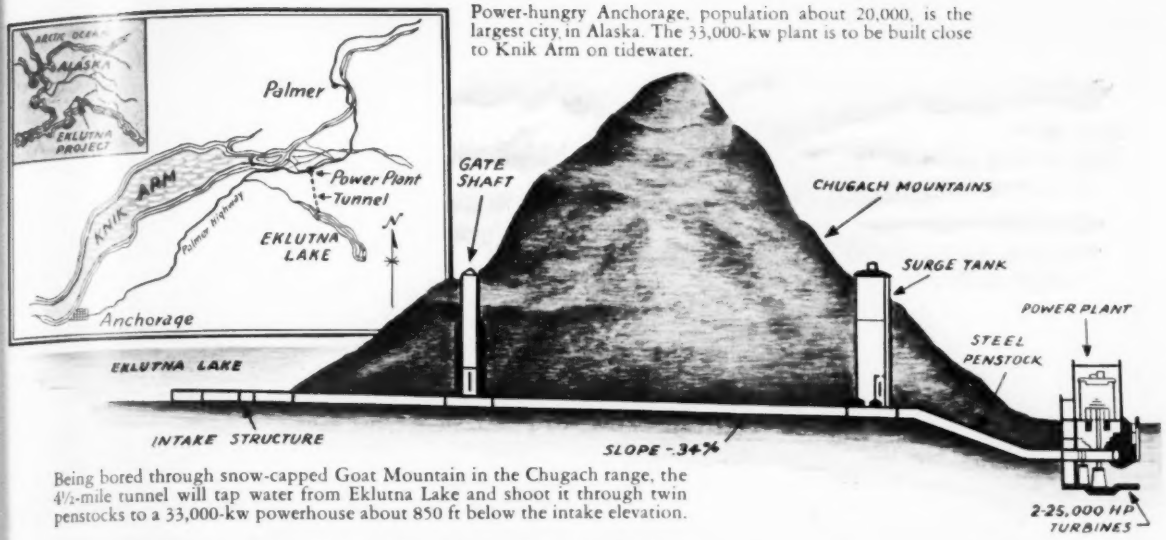
This manufacturing policy accounts for the constant flow of repeat orders we are favored with by our customers.

Regardless of the type of car you need, you'll find us building them as they should be built for a long life of trouble free operation, continuous service and lowest maintenance.

We would like getting together on your car requirements.

SANFORD-DAY IRON WORKS

KNOXVILLE — TENNESSEE



Power-hungry Anchorage, population about 20,000, is the largest city in Alaska. The 33,000-kw plant is to be built close to Knik Arm on tidewater.

Being bored through snow-capped Goat Mountain in the Chugach range, the 4½-mile tunnel will tap water from Eklutna Lake and shoot it through twin penstocks to a 33,000-kw powerhouse about 850 ft below the intake elevation.

Driving 4½-Mile Eklutna Tunnel for first big power project in Alaska

Late in 1951 construction got under way on Eklutna Tunnel, principal feature of a project which will harness water from a glacier-fed lake to generate electric power for the Anchorage area.

When the horseshoe-shaped tunnel has been bored 4½ miles through rock, its diameter of 11 ft will be concrete-lined to form a 9-ft conduit. Other phases of the $17,350,000 contract call for a surge tank, 1,390 ft of penstock tunnel, and alterations to a regulating dam at the outlet of the lake. The underwater intake of the tunnel will permit full operation when 60-below weather caps Eklutna Lake with thick ice.

Despite an excessive flow of subterranean water, the drilling and mucking crews have averaged a daily advance of about 20 ft from the downstream end. Rock is of a broken sedimentary type, mostly gray-wacke with quartz and calcite stringers. Like so many hard-rock men, the contractors are relying exclusively on Bethlehem hollow drill steel.

Due for completion in August, 1954, the contract is a joint venture of Peter Kiewit Sons, Coker Construction Co., and Morrison-Knudsen Co. The three firms are organized as Palmer Constructors for this U. S. Bureau of Reclamation project.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

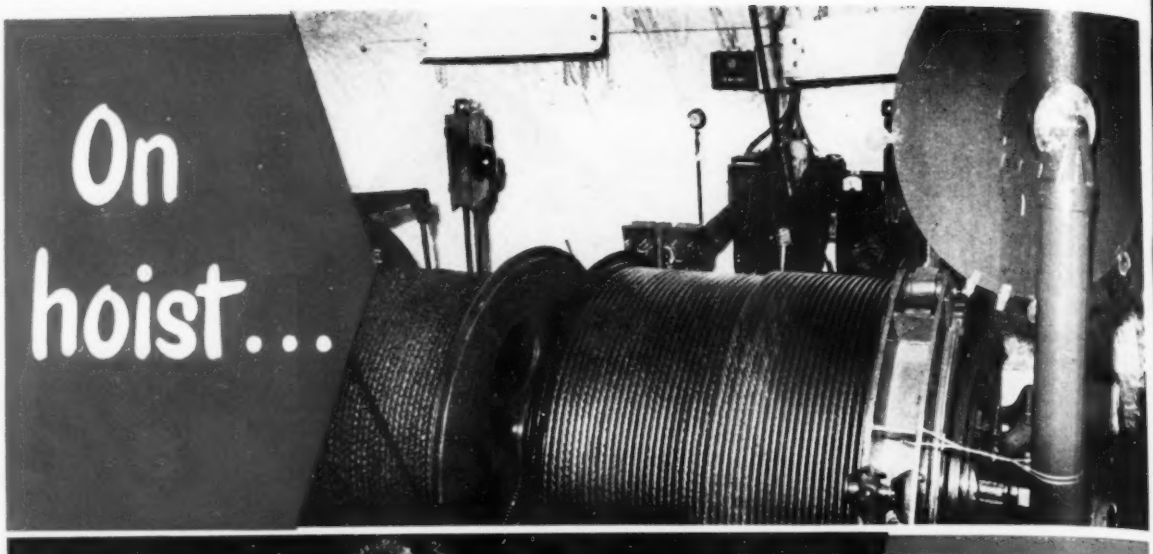
Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Honolulu

BETHLEHEM STEEL

Access for drilling is through a passage near the surge tank at the outlet of the horseshoe tunnel being excavated to an 11-ft diam. The jumbo mounts four drifters equipped with rods of Bethlehem hollow drill steel.

Eklutna Tunnel will be 4,500 ft below ground at its deepest point. Each round is drilled with 28 holes of 4- to 5-ft depth. Progress has been hampered by excessive water and broken rock; note steel support ribs.

BETHLEHEM PACIFIC



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Edwards Wire Rope stays on the job

WIRE ROPE that stays on the job with less down-time for replacement means safer operation and assures you lower cost-per-ton of material moved.

There's an Edwards Wire Rope built to give you long, trouble-free service on each specific mining operation, from hoisting to scraper work.

Technical Field Representatives are at your service on request, to help you select the right rope for every job from the complete Edwards line.

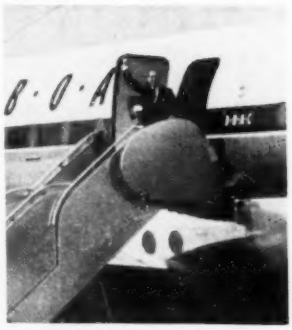
EDWARDS WIRE ROPE

E. H. EDWARDS COMPANY

General Office: SOUTH SAN FRANCISCO, CALIF., Los Angeles, Houston, Seattle, Portland

—Drifts and Crosscuts—

Report from Europe—England is the Mecca for thousands of United States citizens this year. Not surprising is the fact that one of them is Karel Wegkamp, Chicago district manager of MINING WORLD. He arrived in London shortly after the Coronation and lost no time in starting a long series of calls on prominent English mining engineers and companies.



Wegkamp off for London

One of the most important places he visited is the London Metal Exchange where "Free Trading" in lead and zinc, since the first of the year, has adversely affected the world's base metal producers. The London metal prices have consistently been lower than the United States prices. While domestic metal sales have been much greater tonnagewise, the London prices have been the "tail wagging the dog" to set the world price pattern. With copper to be "free traded" again in August, the Exchange will grow in importance. Watch for an article on the London Metal Exchange and how it operates in an early issue.

Despite the transfer of the head offices of many of the Northern Rhodesian copper companies to Africa to escape double taxation, London remains one of the world's mining capitols. While in London Mr. Wegkamp will have an opportunity to check on mining developments underway and planned in all the Dominions, English Colonies and Protectorates.

The next stop on his extended mining trip will be Paris where arrangements have been made for first hand reports on France and mining in French Colonies overseas.

A Job Well Done—The objectives of the Defense Materials Procurement Agency have virtually been completed successfully and mining industry leaders who directed its multi-phase activities are returning to private employment. Howard I. Young, who has served his country so well in two wars is largely responsible for the accomplishments of the DMPA. He will again be able to devote full time to his industry position as president of the American Zinc, Lead and Smelting Company. The recent naming of The American Zinc Company of Tennessee's new mine as the Young mine is a fitting tribute, both to his work for his company and the country. In the news section of this issue the start of the Young mine, which will be one of the world's greatest zinc mines, is pictured.

Activity Abroad—Exploration in Katanga Province, Belgian Congo, Africa may result in the delimitation of a major copper deposit. . . . Optimistic reports indicate it may be the "largest single deposit" in the world. . . . No figures are available regarding whether largest means ore tonnagewise or greatest metal tonnage. . . . It's in copper country. . . . Between Fungurume and Tenke and east of the big Musonoi copper-cobalt mine. . . . ¶ The Republic of Korea may become an important producer of columbite. . . . Both pegmatites and placers contain appreciable concentrations of both columbite and tantalite. . . . Typical hand-cobbed ore assays 58.1 percent Cb_2O_5 and 15.6 percent Ta_2O_5. . . . Some production has been made by the Korea Rare Element Ore Development Corporation. . . . ¶ Interest in copper in Cuba's Matahambre district is increasing. . . . Minas Matahambre de Priuri Cia is cleaning out and reequipping the Mona mine which produced three times previously. . . . The El Francisco mine is being reopened by Cuban interests. . . . Also in the same district the Dora mine, a former producer, is being reopened . . . ¶ Gold and copper exploration continues at fast pace in Africa . . . Capital Mining Areas Ltd. as Union Corporation has formed five exploration companies—Poplar, Accacia, Keurboom, Wonderboom, and Maple—for prospect gold drilling in the Bethel, Transvaal district . . . ¶ In Northern Rhodesia the Rhodesian Selection Trust Limited is prospecting four large areas near the Northern Rhodesia-Belgian Congo border . . . Headquarters is at the new town of Kalulushi . . . It is seven miles west of Kitwe adjoining Chibuluma Mines Limited's new mine.

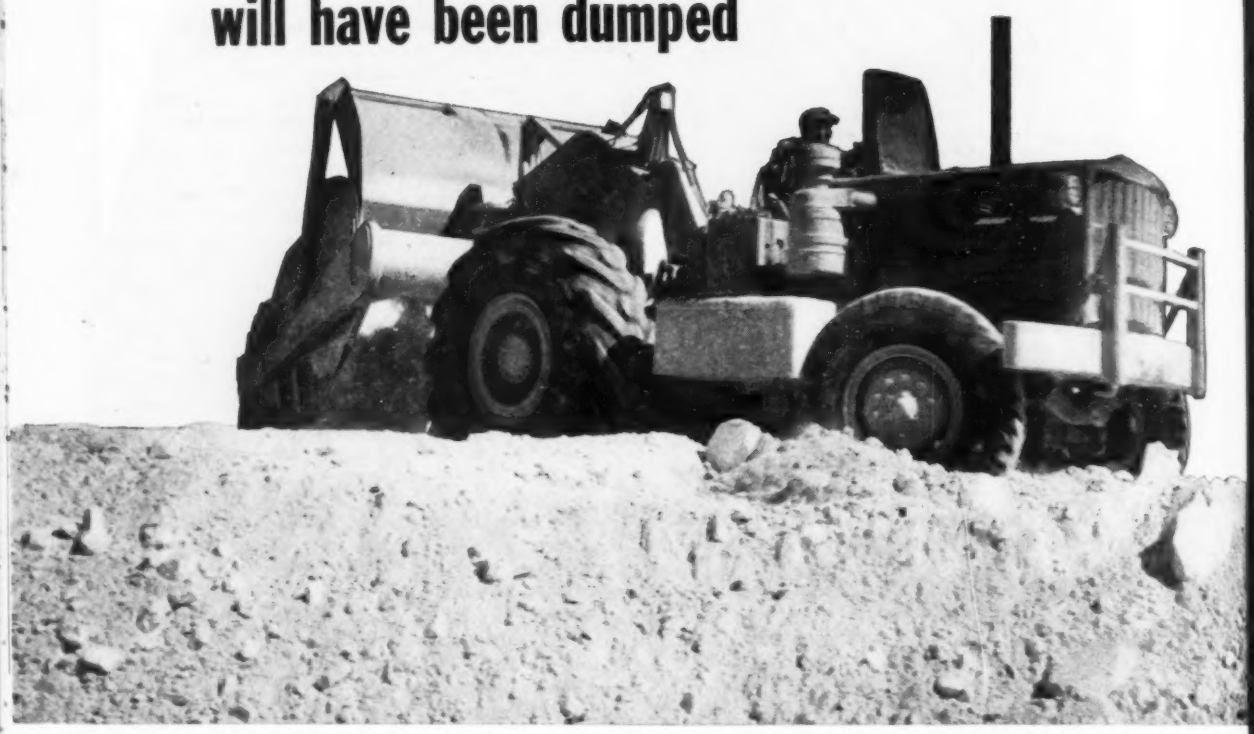
Treatment Trends—Rhodium is the newest on the list of metals to be recovered by ion exchange . . . International Nickel Company of Canada, Limited is using this method at its Platinum Metals Refinery in Acton, England . . . ¶ Pure silicon at $430.00 per pound is now being produced by The DuPont Company . . . A new process was developed and production is being increased . . . Greatest use appears to be in transistors . . . Has ability to withstand higher temperatures and to handle more power than other semi-electric conductors . . . ¶ A continuous electrolytic process for producing high-purity alumina from clay has been perfected . . . A pilot plant has been in operation for two years in Europe . . . Power requirements are less than 2.0 killowatt hours per pound . . . It is called the Lobeth process.

Metal Markets—Brooks & Perkins, Detroit, Michigan is looking for uses for large sizes of magnesium plate . . . It is light weight and corrosion resistant . . . Plates are $\frac{3}{8}$ to 1.0 inches thick . . . Widths are up to 60 inches and lengths to 186 inches . . . One of newest uses for the big plate is for concrete forms.

Domestic Developments—The U. S. Atomic Energy Commission has started a large uranium prospecting program in Hillsborough and Polk counties Florida . . . The United States Geological Survey will study cores in an attempt to find out why uranium is found in association with phosphate . . . International Minerals & Chemical Corporation will do first drilling under contract . . . Area 30 to 40 miles in diameter may eventually be drilled to 100 foot average depth.

Gold—Have you seen the new gold Hercules? . . . It is a coin-like ingot. . . . Weighs exactly 1.0 troy ounce of fine gold. . . . Bears the assay stamp of the London Royal Mint Refinery. . . . First introduced in the Tangiers Free Gold market where it sold for $38.25.

By the time you finish the first paragraph, 22 yds. of Dicalite will have been dumped



In mining, speed is profit. That's why the machines working for Great Lakes Carbon Corp., Los Angeles, Calif., are high-speed Caterpillar DW20 Tractors with matching No. 20 Scrapers. Carrying 22 loose yds. of Dicalite from pit to stockpile near Lompoc, Calif., these brawny units have a spreading time of *15 seconds*.

Each of Great Lakes Carbon's three DW20 units whips through seven trips an hour on a 1.2-mile haul. In one 10-hour day, the trio haul 4,620 yds. of Dicalite to the stockpile.

Unusual performance? No, sir! This unit is expected to deliver because it is all-Caterpillar built—every part created specifically for this type of work. There's extra power and capacity built into the Cat* DW20 Tractor and No. 20 Scraper team. The 225-HP engine in the tractor precisely balances the scraper's capacity to give sustained, long-haul, high-speed, low-cost service.

Quick spreading of any material results from the scraper's high apron lift and positive ejection. Combine this with its cable controls and you are positive of fast, sure loading and spreading.

But, just as important, this equipment is built for a long, productive life. Let your Caterpillar Dealer demonstrate these profit-building units. They're worth looking into.

Caterpillar Tractor Co., San Leandro, Calif.; Peoria, Ill.

CATERPILLAR*

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NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

CAPITOL CONCENTRATES

PRESIDENT'S DOMESTIC MINE POLICY INDICATED IN LETTER

The desperate plight of the domestic lead and zinc mining industry has been brought to President Eisenhower's attention through personal messages from various Congressmen and by the hearing on the Simpson bill before the House Ways and Means Committee. As a result, he has at last made a statement.

Writing to Representative Ed. Edmondson of Oklahoma, President Eisenhower said he believes a strong domestic mining industry is vital to the national security and prosperity. The President also said:

"I hope that the Administration may find a way of relieving the depressed conditions that prevail within many mining districts. We must find a solution that is equitable to all concerned and I am encouraging the Congress and the agencies within the executive branch to work toward that end. The Interior Department in particular has been asked to devote its energies in that direction."

These are fair words and the nearest to a real statement on domestic mineral policy that has yet emanated from the White House. Now it remains to be seen if anything actually will be done to back the words.

• *Opposition To Gold Price Increase Expected*

The Eisenhower administration probably will continue to oppose an increase in the price of gold, now pegged at $35.00 an ounce, stated Representative Clair Engle of California.

Engle reported that he had discussed the problem of the gold miner with W. Randolph Burgess, former Chase National Bank official who is special adviser to the Secretary of the Treasury on monetary matters. Burgess believes that a free market for gold higher than the price paid by the government would tend to undermine public confidence in the stability of the dollar, Engle said.

Congressman Engle is sponsoring legislation to provide for a free market for domestic newly mined gold. His bill is the companion one to S. 13, introduced by Senator McCarran of Nevada.

• *Simpson Bill Now In Two Parts*

Congressman Richard M. Simpson, chairman of the House Ways and Means Committee, has introduced two new bills, H. R. 5495 and H. R. 5496, relating to the reciprocal trade agreements program.

The first bill contains the one-year extension of the tariff-cutting program, until June 12, 1954; authorization of a 17-man commission requested by the president to study United States foreign economic policy; an increase in the size of the Tariff Commission from six to seven members; and a reduction of the time, from one year to nine months, in which the Tariff Commission must make its report on applications for relief under the escape clause.

The second bill is identical with the original Simpson (H. R. 4294) Bill, on which public hearings have already been heard by the House Ways and Means Committee except that the following provisions of the original bill have been omitted: the provision extending for one year the authority of the president to enter into new trade agreements; increasing the Tariff Commission membership from six to seven; and shortening from one year to six months the period the Tariff Commission has to make a report under the escape clause procedure.

The testimony of various government officials before the House Ways and Means Committee in all instances has been unfavorable to the lead and zinc tariff features of the original Simpson bill. While expressing regret for the present difficulties of the industry, the only solution the witnesses offer is to take advantage of the escape-clause provisions of the present act. Aside from the length of time it takes to get a decision under the escape clause, the best adjustment that could be made would do domestic lead and zinc producers very little good say mine operators.

• *What's Behind The Paley Report?*

It has been suggested to Senator George W. Malone of Nevada that his Mines and Mining Subcommittee could render real service to the mining industry by conducting an investigation of those who participated in the preparation of the Paley Report. This investigation would attempt to uncover the sources used for data presented, the background of those compiling and writing the report, and the real purpose behind many of the radical recommendations contained.

Such an investigation, it was said, would probably reveal a very definite desire on the part of the authors to hold back the development of the mineral resources of this country and to foster the development of foreign deposits.

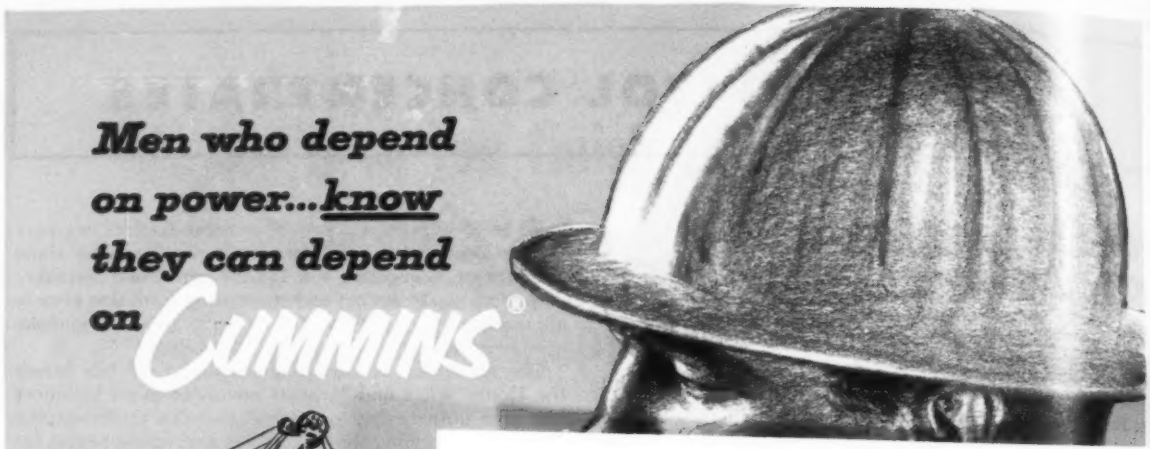
Statements and recommendations of the Paley Report are being accepted generally as incontestable facts, rather than propaganda, and the longer this condition continues the more difficult it will be to combat.

Senator Malone was selected as the logical person to launch such an investigation, due to his personal attitude on the trade-not-aid program and his consistent support of domestic mining. In addition, Senator Malone is head of the Senate Mines and Mining Subcommittee which normally would investigate matters affecting the industry.

Similar Senate legislation has been introduced by Senator George Malone of Nevada. He made it clear that he intended none of the provisions in his bill to apply to foreign ore purchases. It is believed that when the Senate Committee takes up the bill, consideration will be given to the possibility of amending H. R. 2824 to include certain of the other minerals.

• *Subcommittee Report Favors D'Ewart Bill*

H. R. 4983 by Representative D'Ewart of Montana was favorably reported to the Interior and Insular Affairs Committee on May 26 by the Subcommittee on Mines and Mining. This bill defines the surface rights vested in the locator of a mining claim prior to the issuance of a patent. It does not in any way limit or restrict any existing rights of any locator who located a valid mining claim prior to the passage of the act. The definitions in



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Yes, Cummins ranks as the leader in boosting diesel power, [illegible] stamina . . . reducing dead weight and bulk. The result: engines that are *tough* yet *mobile!* The story of the modern lightweight, high-speed diesel is the story of Cummins. Today, as in the past, Cummins sets the pace . . . works continuously to produce diesel engines that get more work done at lower cost, that outperform all others on every job.

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TESTING SERVICE

for west coast mills having new or unusual metallurgical problems

...ement through Cyanamid Field ... Western Mills have access to ...ies of the Cyanamid Mineral ...Laboratory with its chemical, ...nd microscopal divisions for ...y metallic or non-metallic ore ...nining the most efficient treat...od.

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Orders for Cyanide, Flotation Reagents and other Metallurgical Chemicals may be placed with American Cyanamid Company, Azusa, California; El Paso, Texas; or c/o Weicker Transfer & Storage Co., Denver, Colorado.

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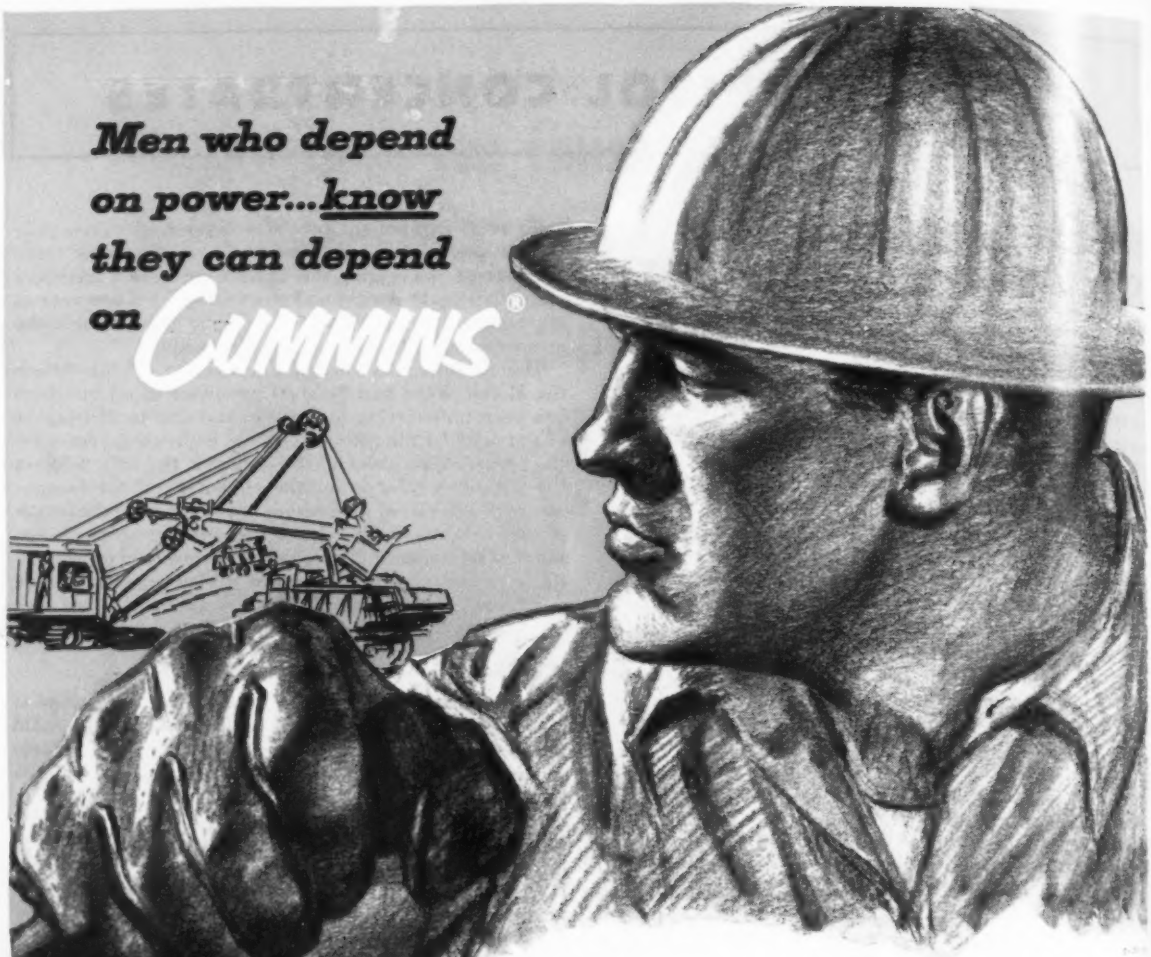

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demonstrating Cummins' performance in all power jobs.

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are engineered to make light work of tough jobs

You know it pays to hire the most experienced worker. In the field of rugged, lightweight, high-speed diesels, Cummins has logged more *pioneering* time than any other engine maker.

Yes, Cummins ranks as the leader in boosting diesel power, flexibility and stamina . . . reducing dead weight and bulk. The result: engines that are *tough* yet *mobile!* The story of the modern lightweight, high-speed diesel is the story of Cummins. Today, as in the past, Cummins sets the pace . . . works continuously to produce diesel engines that get more work done at lower cost, that outperform all others on every job.

Find out what a Cummins Diesel (60-600 h.p.) can do in your operations. Your Cummins dealer is ready to give you *all the facts*. Call him today.

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Under the new policy "every effort shall be made in every loan to obtain the participation of a bank or other financial institution to the maximum amount possible." Only when no participation is available will direct loans be made. Attempts must be made to procure a "V" loan from an interested procurement branch of the government and if you cannot get this it shall be "conclusive evidence that the making of the loan by RFC would not be in the public interest."

What was a bad situation then appears to be hopeless now. Better get chummy with your banker, boys!

• Reorganization Plan Has Two-Fold Objective

The reorganization of the Interior Department proposed by Secretary McKay will eliminate from the secretary's office the program staffs which have had the duty of planning programs for water and power, land utilization, minerals and fuels, and international activities. The secretary's representatives on the various field committees also will be withdrawn if these plans go through. This would appear to be a decentralization move as well as part of the general economy drive.

• Subcommittee Endorses Regan Bill

The Subcommittee on Mines and Mining of the House Committee on Interior and Insular Affairs has reported favorably to the full committee H.R. 334 for the disposition of deposits of sand, stone, gravel, pumice, pumicite and cinders situated on public lands. The bill, by Representative Regan of Texas, passed the House last session but was buried in the Senate Interior Committee where it died along with many other House-passed bills at the end of the 82nd Congress. In National Forest, the Secretary of Agriculture may set up a leasing ad sale system for the specific minerals listed. It seems to be one more step in federal control of minerals.

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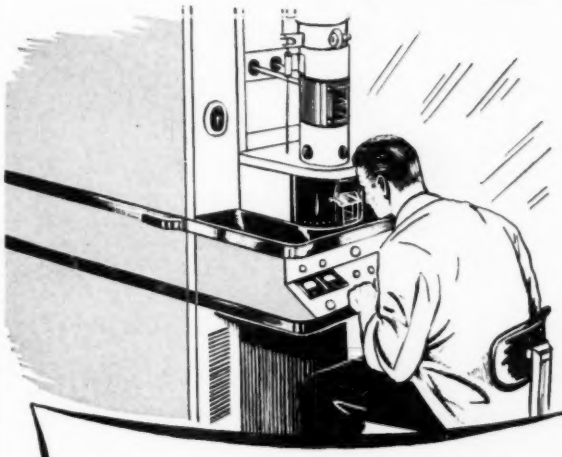

By arrangement through Cyanamid Field Engineers, Western Mills have access to the facilities of the Cyanamid Mineral Dressing Laboratory with its chemical, physical and microscopal divisions for testing any metallic or non-metallic ore and determining the most efficient treatment method.

Whether you can best use cyanidation, flotation, Heavy-Media Separation, Dutch State Mines Cyclone Separator or any combination of these with other methods, Cyanamid stands ready with the reagents, processes and technical know-how to help you get highest recovery at lowest cost.

Orders for Cyanide, Flotation Reagents and other Metallurgical Chemicals may be placed with American Cyanamid Company, Azusa, California; El Paso, Texas; or c/o Weicker Transfer & Storage Co., Denver, Colorado.

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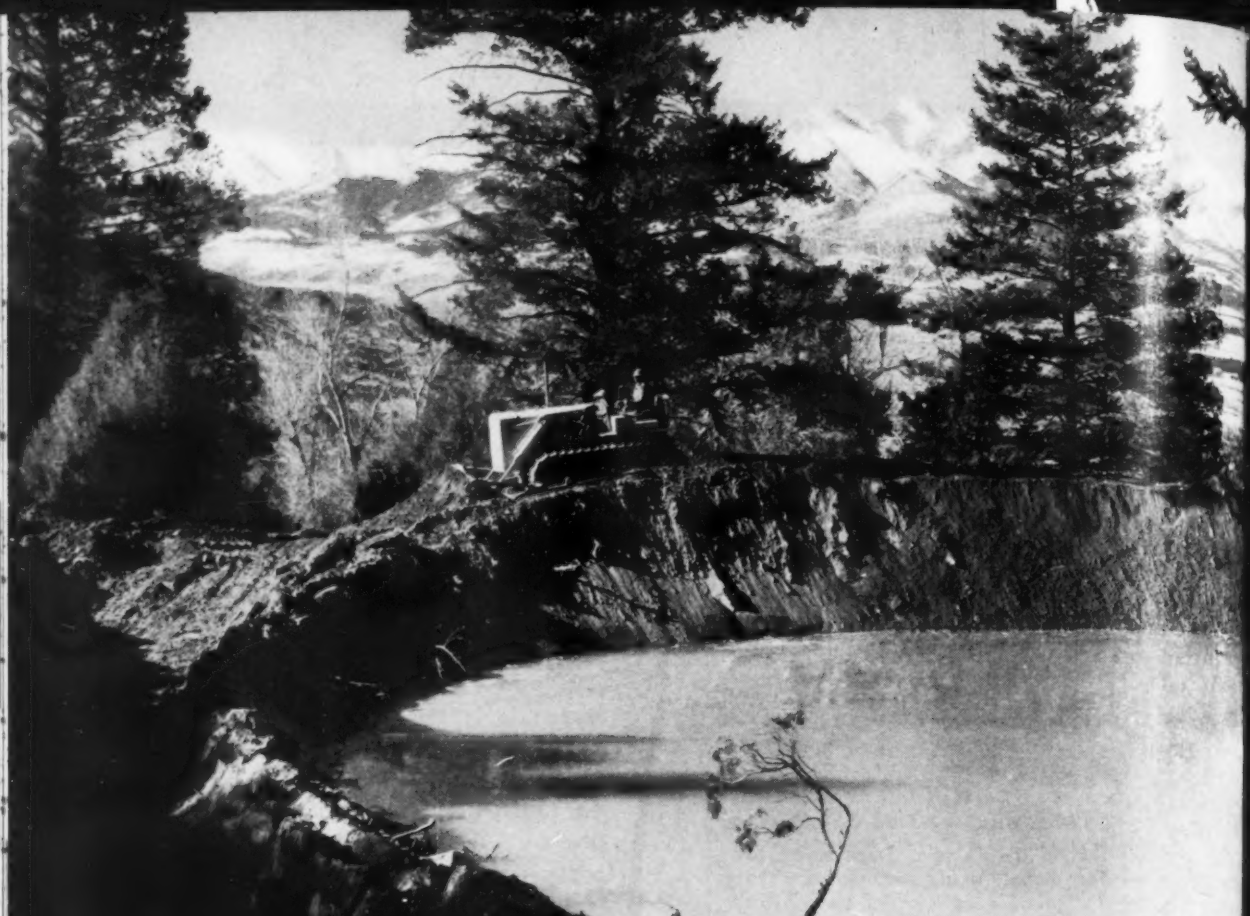

High in mountains near Poncha Springs, Colo., this Caterpillar D6 Tractor with [illegible] Bulldozer, owned by Reynolds Mining Corp., constructs a new fluorspar settling [illegible] Fluorspar will be used in Reynolds' Alexander, Ark., aluminum plant. Across [illegible] are beautiful Collegiate Peaks, near famed Leadville mining district.

— ON TOP OF THE WORLD...ON TOP OF THE JOB

Even in tough going like this, the Cat* D6 Tractor stays on top of the job. At about 8,000 feet altitude, it 'dozes rocks and dirt—much of the latter frozen—in temperatures that range from summer heat to far below zero.

High altitude is a difficult test of an engine, but the rugged Caterpillar-built Diesel Tractor delivers plenty of power to do rough jobs fast. It's built to keep working for you for many thousands of hours without down time or tinkering, thanks to sturdy construction, specially hardened cylinder liners, long-wearing aluminum-alloy bearings, and efficient oil and air filtration.

The versatile No. 6A angling blade can drift material over banks as well as do straight 'dozing. Scientific curving of the moldboard permits big, rolling, fast-moving loads. This means you get more work per hour—*more work per dollar*—from a Cat-built Bulldozer.

Many jobs around mines are equipment-busters. That's why you need the extra, built-in *toughness* of Caterpillar machines. Your Caterpillar Dealer will gladly show you, on the job, the tractor and matched bulldozer that will do most for you at lowest cost. Your dealer backs his products with fast, skilled service and genuine factory parts.

Caterpillar Tractor Co., San Leandro, Cal.; Peoria, Ill.

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INTERNATIONAL PANORAMA

LEAD, SOUTH DAKOTA—Production of "deep ore" by Homestake Mining Company in March was 121,000 tons for an all-time monthly high. First quarter production of gold ore was 322,000 tons compared with 244,536 in same 1952 period.

JOHANNESBURG—The East Champ D'or Gold Mining Company, Limited is the latest South African gold mine scheduled to recover byproduct uranium. Because of limited uranium ore, East Champ will not build a new plant. Cyanide slimes will be treated by the Randfontein Estates Gold Mining Company Witwatersrand, Limited.

BARTOW, FLORIDA—For the first time pebble phosphate mining willl be permitted in the city of Bartow under a new city ordinance. Independent Chemical Company will operate an open-pit mine, but must restore the surface after the pit is mined out.

FERNALD, OHIO—The world's first production mill for the rolling of pure uranium ingots into bars has been placed in operation at the United States Atomic Energy Commission's production center here.

SINGAPORE—Strict tin export license regulations have been established by the Singapore Government in order to control destination of shipments.

WASHINGTON, D. C.—The government's third round of aluminum plant expansion has been slowed by financing difficulties by Olin Industries and Wheland Company. The proposed combined capacity of the two firms was 200,000 annual tons of aluminum.

JOHANNESBURG—South Africa's second uranium byproduct plant has been placed in operation. The plant processes gold cyanide slime from the Daggafontein Mines, Limited.

MOROCOCHA, PERU—In the first quarter of 1953 production of lead, zinc, and silver by the Cerro de Pasco Corporation was higher than for same period in 1952.

TORONTO—Falconbridge Nickel Mines, Ltd. is modernizing its mines and treatment facilities to double nickel production to 60,000,000 annual pounds.

SAN FRANCISCO—The General Chemical Division of Allied Chemical and Dye Corporation has started its new aluminum fluoride plant. The plant treats acid-grade fluorite from Kaiser Aluminum and Chemical Corporation's Fallon, Nevada flotation mill to produce synthetic cryolite for alumina refining.

CARLSBAD, NEW MEXICO—The International Minerals & Chemical Corporation has placed its new hydrochloric acid-magnesium oxide plant in operation here. Production is a byproduct from potassium sulphate refining.

MARYSVALE, UTAH—A new uranium mineral has been identified from ores mined here. It has been named "Umohite" and is a hydrous uranium molybdate containing 48 percent uranium.

BATESVILLE, ARKANSAS—The Hopwood Manganese Company has started construction of a manganese washing plant six miles north of here to treat locally mined ores.

MEXICO CITY—A rich strike of gold ore has been reported to have been made by a prospector near Clavellinas, Concepcion del Oro municipality, Zacatecas State.

WALLACE, IDAHO—Polaris Mining Company is undertaking a $675,000 exploration program from the 3,000-foot level of the Silver Summit mine. Key item is a 10,000-foot-long exploration drift easterly into mineralized areas.

CARLSBAD, NEW MEXICO—Shipments of potash by United States producers in the first quarter of 1953 were at an all-time high of 898,913 tons of potash salts (522,151 tons of K_2O). Increases over 1952 were 35 and 37 percent, respectively.

SAO PAULO, BRAZIL—A deposit of djalmaite, an oxide of tantalum and uranium, has been found at Sao Joao d'El Rey, in Minas Gerais State in association with cassiterite.

COPPER CLIFF, ONTARIO—The International Nickel Company of Canada, Limited has signed a contract to deliver 60,000 tons of nickel and 50,000 tons of electrolytic copper to the United States government. Shipments will start in December and end in 1958.

SILVER PEAK, NEVADA—Sunshine Mining Company has taken over management and operation of the Mohawk silver mine here. Sunshine, the largest United States silver producer, will double mine output and build a mill when development warrants.

MEXICO CITY—Small manganese mines in Chihuahua, Durango, Zacatecas, San Luis Potosi, and Jalisco States will sell 136,000 tons of manganese ore to the DMPA. This is the second such contract with Mexican producers.

DARWIN, NORTHERN TERRITORY—The Australian Commonwealth government has increased the price for uranium ore to encourage prospecting. The exact price is secret, but is reportedly comparable to that paid by the U. S. Atomic Energy Commission for Colorado Plateau ores.

RAPID CITY, SOUTH DAKOTA—The U. S. Bureau of Mines has started its new 100-pound-per-hour continuous beryl recovery pilot plant. Flotation feed will be non-lithium berylliferous pegmatite.

TUCSON, ARIZONA—The Banner Mining Company has contracted with the DMPA to mine and sell 6,480 tons of copper and all molybdenum produced from a new plant to treat ores from the Mineral Hill and Plumed Knight mines in Pima County.

WASHINGTON, D. C.—Production of 402 tons of cadmium in March by United States plants was the highest monthly output ever reached.

RIO DE JANEIRO—Proberil, S. A. Rio de Janeiro, a beryl mining firm, will develop several mines in Minas Gerais State with funds advanced by DMPA. An option on $150,000 worth of beryl at $50.00 per metric ton unit is held by DMPA.

VATUKUOLA, FIJI—Emperor Gold Mining Company has made a major gold ore discovery southeast of the Wallace Smith shaft.

Break World Shaft Sinking Record at 585 Feet in May

The world's shaft sinking record has been broken again in the Union of South Africa. In May 585 feet were sunk to eclipse the old record of 504 feet set in April 1951. The new record was set in the No. 2 shaft of the Vlakfontein Gold Mining Company Ltd. near Springs in the center of the Far East Rand. The shaft was sunk from a depth of 3,348 to 3,933 feet through quartzite of the Kimberley series. The circular shaft is 24 feet one inch internal diameter, is monolitically concrete-lined and mucking was done by an air-operated cactus grab.

Vlakfontein is one of the mines of the Consolidated Goldfields of South Africa and has been in production for a number of years; in fact, in 1952 a record of 447,000 tons of gold ore from the Nigel or Main Reef was mined and milled. The new shaft is planned to develop the western portion of the mine and was started in late 1951. Projected depth to the reef is 6,800 feet.

In 1951 the shaft was started and 102 feet sunk. During 1952 progress was slow because of the necessity for cementing water-bearing fissures, so the average monthly footage sunk was only 198. However, during the last three months sinking averaged 298 feet. In 1953 an average of 207 feet was sunk in January, February, and March. April footage was 248, and the record in May was 585 feet—or 18 feet 11 inches per day.

The previous world record of 504 feet at the No. 3 shaft of the Virginia Orange Free State Gold Mining Company Limited was described in June 1951, MINING WORLD, pp. 34, 35, 36. A complete description of mechanized shaft mucking in South Africa which made the new record possible appeared in the April 1952 issue of MINING WORLD, pp. 29, 30, 31.

New Penn Mines Diamond Drilling Copper Property

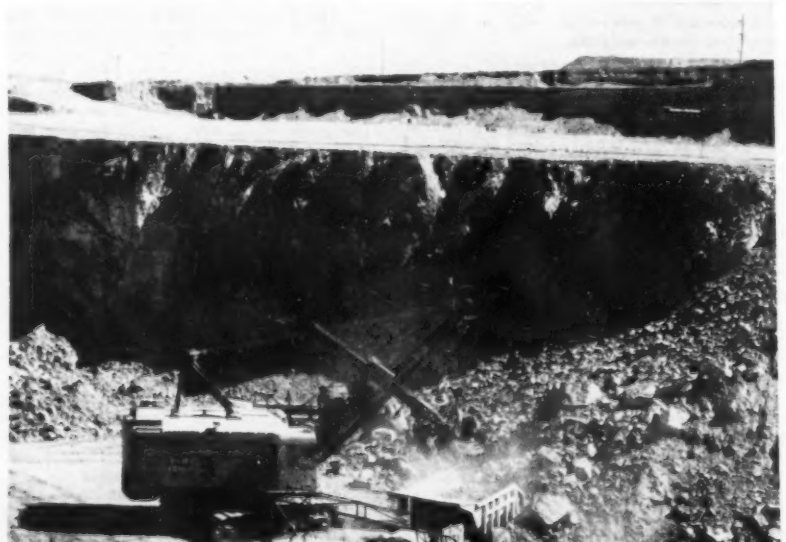
New Penn Mines, Inc. is conducting a $160,000 underground diamond drilling program at its Penn copper-zinc-gold-silver mine at Campo Seco, Calaveras County, California. The company has signed an exploration contract with the DMEA calling for equal government and company financing of the project.

Robert F. Playter, chief geologist, Gold Fields American Development Company is in charge of the drilling which is being done from the 1100 and 1400 levels of the No. 3 shaft to check geological structures in depth. New Penn is a subsidiary of Gold Fields American and was formed to operate and further develop the famous old Penn mine in 1952. New Penn has discontinued all mining and milling operations due to low metal prices and is concentrating on exploration and development.

YERINGTON PROGRESS REPORT

Anaconda Copper Mining Company readies the Yerington Project—a Nevada pit and plant where copper is to be recovered from low grade oxide ores—for initial leach operation in October of this year

Construction at Anaconda Copper Mining Company's newest project has been maintained on schedule and is now nearing completion at Weed Heights, Nevada. Designed to supply 5,500,000 pounds of copper per month from a disseminated low-grade oxide deposit, the Yerington Project will be ready for initial operation in October of this year. Full production of 11,000 tons of ore per day will be reached shortly thereafter.



Electric power shovels carrying 5-yard dippers load 25-ton, 300-hp. rear-dump trucks at the rate of over 6,000 tons per shovel shift.

At present, about 9,000,000 tons of waste have been removed as preliminary stripping necessary to prepare the deposit for full-scale mining.

The project is being directed by A. E. Millar, general manager; H. R. Burch, mine superintendent and A. J. Gould, plant superintendent.

A Leaching Project

Included in the $33,000,000 development are an open pit mine using truck haulage, crushing, leaching, precipitation and sulphuric acid plants, a sulphur mine (the Leviathan, 60 miles from Yerington in Alpine County, California) and a townsite to house employees. Of these, the housing project has been completed by Wiechmann and Probasco, Inc., of Reno. The Isbell Construction Company, also of Reno, is completing the access road and preliminary stripping at the sulphur mine. Plant construction by the

Anaconda Copper Mining Company's Yerington Project, designed to recover copper from a low grade oxide deposit by leaching and precipitation, is being readied for initial operation in October of this year. Ore from Yerington's primary gyratory crusher, installed underground in the far right foreground, will be conveyed to a storage area, and thence to the secondary crushing plant under construction at left. Conveyors will be housed in reinforced concrete conveyorways.

McNeil Construction Company is on schedule and will be completed by October 1953.

Mineralized zones now being developed were explored in 1941 and 1942 by churn drilling and diamond drilling performed by McClintock Drilling Company of Spokane, Washington. The property, originally known as the Guild-Adams-Herrin, was acquired by Anaconda in 1942 together with other adjacent groups and an exploration shaft was sunk to a depth of 400 feet. By 1946, exploration had indicated an orebody of some 35,000,000 tons of oxide ore.

Pit and Plant Planning

Plans were formulated to mine the deposit by open pit methods and a plant was designed to recover the copper by controlled leaching and precipitation. Due to the shortage of domestic copper production, the government through its incentive program granted Anaconda a rapid five-year tax write-off on 70 to 75 percent of the amortizable portion of the investment. No government funds are involved; all capital investment is Anaconda Copper Mining Company's own money.

In December 1951 construction was started on the town site. Early in 1952 stripping was commenced in the open pit area.

Preliminary Stripping

Preliminary stripping in the mine is being carried on in order to uncover sufficient quantities of ore to assure the required ore production at the time that the plant may start operating. Any small amounts of ore encountered during the preliminary stripping operations are placed on a separate stockpile in order to be reloaded and shipped to the plant at a later date.

For blast hole drilling churn drills and also one rotary drill are in use. The rotary drill is proving itself to be very satisfactory and at the present time most of the blast hole work is being performed by the rotary machine, the churn drills being used partly for blast hole work and partly for additional prospecting work in the pit proper.

Mine Preparation

In the preliminary stripping operations, part of the ground must be blasted and part of the material can be excavated and loaded without any blasting, the latter being mainly true when digging in the gravel or alluvium overburden. At this time it would not be proper to offer any data regarding consumption of explosives, nor factors showing tons broken per pound.

Broken material—both waste and ore—is loaded by 5-yard electric power shovels into 25-ton Diesel-powered trucks. Four shovels and sufficient trucks are now in use to insure completion of the preliminary stripping by October 1, 1953.

Shovels are so placed on the benches as to operate at a 90° swing. Trucks are backed into position on each side of the shovels. With the relatively short truck hauls (about ½ mile), close cycles are maintained with little or no waiting time for either shovels or trucks. Bulldozers clean up around the shovels—on the side opposite the truck being loaded—and graders and water trucks are constantly at work to insure smooth, hard-packed hauling surface roads.

Plant Construction

McNeil Construction Company is the prime contractor on the plant construction and is rapidly completing the crushing and leaching sec-

The fractured, fissured ore and country rock are drilled—at a high rate per shift—with a rotary drill that sinks 7⅞-inch diameter holes on about 18-foot centers with 25 to 40-foot burden at the toe, a pattern varied often to meet changing rock conditions.

To protect the reinforced concrete of the leaching tanks from the sulphuric acid, the walls and floors are lined with mastic.

tions. The primary crusher is a large gyratory housed in an underground reinforced concrete structure with a receiving bin above it flush with the surface to allow trucks to dump directly without using ramps or conveyors. From the crusher discharge ore will be carried to a storage area, and from here to the secondary crusher by conveyors. Most of the structural work on this section has been completed. Excavation for the crushing section totalled 45,000 cubic yards.

Leaching vats are under construction and mastic is being placed on the inside surfaces of the completed concrete leaching tanks in order to protect the concrete from the corroding action of acid.

Charging of the leaching vats will be by means of a loading bridge which will span the leaching vats and will travel the entire length. Unloading of the leaching residue will be by means of an unloading bridge using a clamshell. The leached residue will be loaded into trucks similar to the ones used in the mining operations and these trucks will take this material to the tailing disposal area.

Precipitation of the copper will be in the launders provided for that purpose. These launders will be charged with light gauge scrap iron by means of a gantry crane which will span the precipitation launders and travel the entire length of same.

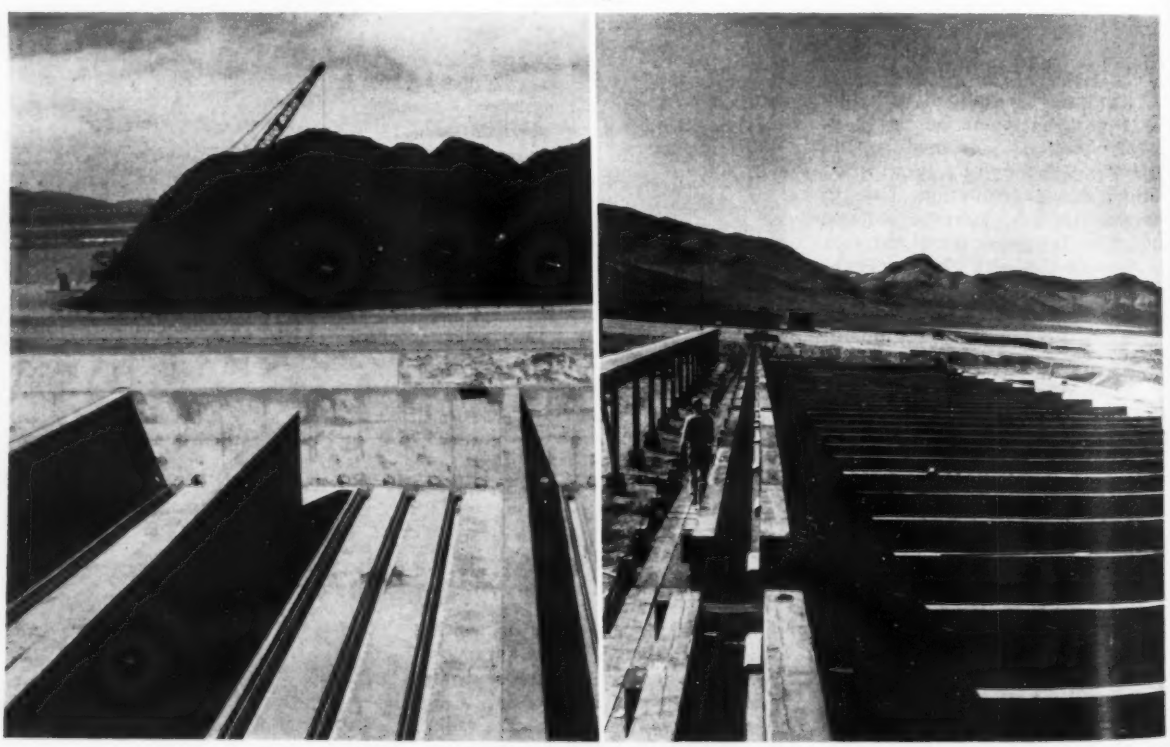
Precipitates—"cement" copper—will be trucked to the railhead, a distance of twelve miles from the plant, and shipped to Anaconda's Montana smelter and refinery for processing.

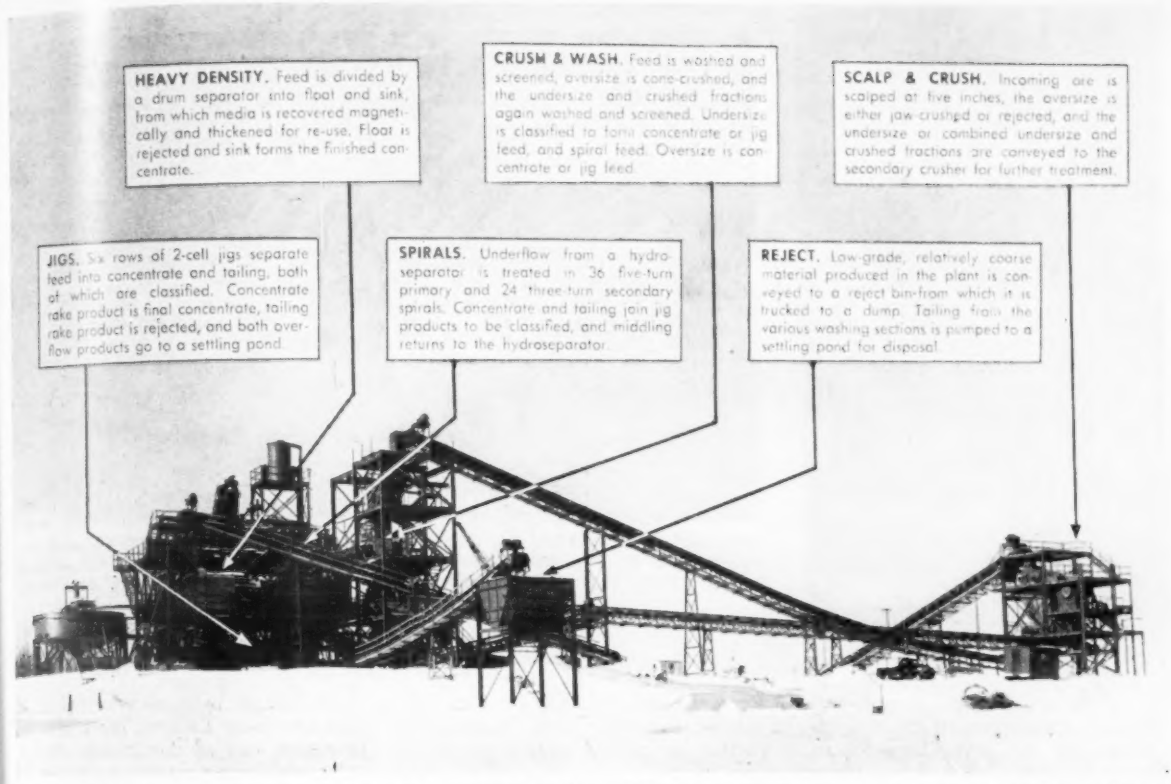
Included—Modern Housing

Housing at Anaconda's new town near Yerington includes 250 family units, guest house, manager's residence, a mess and recreation hall, eight units for single men each accommodating sixteen men; most of the units are now occupied. The town has been named Weed Heights in honor of the company's vice president in charge of operations, Clyde E. Weed, whose work is largely responsible for the project.

Other facilities at the project that have been completed or are under construction include a large modern office building and complete repair and maintenance shops.

Precipitation tanks will be used at Yerington to remove copper from the pregnant solution coming from the leaching vats. Properly processed tin cans will be used in precipitation. A stockpile of the prepared cans is being stacked near the tanks to insure a reserve supply when plant operation begins.




HEAVY DENSITY. Feed is divided by a drum separator into float and sink, from which media is recovered magnetically and thickened for re-use. Float is rejected and sink forms the finished concentrate.
CRUSH & WASH. Feed is washed and screened, oversize is cone-crushed, and the undersize and crushed fractions again washed and screened. Undersize is classified to form concentrate or jig feed, and spiral feed. Oversize is concentrate or jig feed.
SCALP & CRUSH. Incoming ore is scalped at five inches, the oversize is either jaw-crushed or rejected, and the undersize or combined undersize and crushed fractions are conveyed to the secondary crusher for further treatment.
JIGS. Six rows of 2-cell jigs separate feed into concentrate and tailing, both of which are classified. Concentrate rake product is final concentrate, tailing rake product is rejected, and both overflow products go to a settling pond.
SPIRALS. Underflow from a hydroseparator is treated in 36 five-turn primary and 24 three-turn secondary spirals. Concentrate and tailing join jig products to be classified, and middling returns to the hydroseparator.
REJECT. Low-grade, relatively coarse material produced in the plant is conveyed to a reject bin from which it is trucked to a dump. Tailing from the various washing sections is pumped to a settling pond for disposal.

Coons-Pacific Isle iron ore concentrator near Eveleth, Minnesota has the flexibility of a testing laboratory and uses five beneficiation methods to treat ores from nine mines.

CUSTOM MILLING MESABI IRON ORES

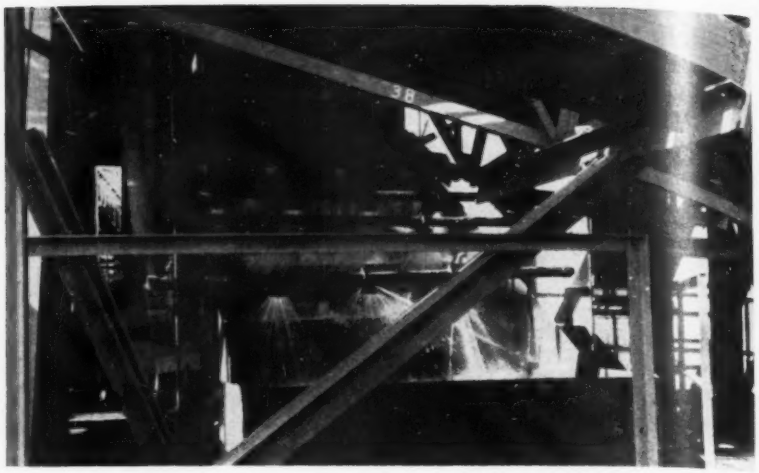
Coons-Pacific Isle beneficiation plant uses any combination of scalping, washing, heavy media, jigging, and spiralling to make five concentrates

By R. L. Burns
Field Editor
MINING WORLD,

Plants designed to treat low-grade soft iron ores amenable to beneficiation are becoming increasingly important on the Lake Superior iron ranges. Though taconite beneficiation has received the bulk of public attention as the iron ranges' most important recent development, considerably more iron ore production in the immediate future will come from beneficiated low-grade ores. Taconite production, because it represents the ingenious and painstaking solutions of seemingly insurmountable problems, and because vast taconite reserves of more or less constant grade are blocked out, deserves the attention it has received. However, low-grade ores—not of the technologically intractable nature of hard, fine-grained, cherty taconites but more similar to the softer, coarser, direct-shipping ores—are of more immediate consequence.

The ease with which many of these ores can be treated to reach the grade required for blast furnace feed

Don Kimball (left) is the Coons-Pacific superintendent and John Boentje, Jr. is general manager.



LEFT: The crushing and scalping section of the Coons-Pacific concentrator is composed of a Hewitt-Robins vibrating screen, a Pioneer jaw crusher, and a 15-ton steel bin for temporary storage. ABOVE: Coarse washing product is sprayed and screened on the Tyrock screen to produce feed for heavy media separation.

and their availability in presently operated mines give them the advantage of an immediate future. Where taconites offer hope for a long-range domestic supply, beneficiated low-grade ores are already supplying much of present furnace feed and would be called upon to furnish the increased needs of an all-out effort in the event of total war. The new mines and expensive plants (as yet undeveloped and unbuilt) needed for taconites could not compete economically nor timewise with the readily available reserves and relatively inexpensive and easily built plants required for low-grade ore beneficiation. Many of these ores require only scalping or screening to reach shipping grade. Even the less tractable require only relatively simple and inexpensive methods of gravity concentration.

Joint Coons-Pacific Isle Plant

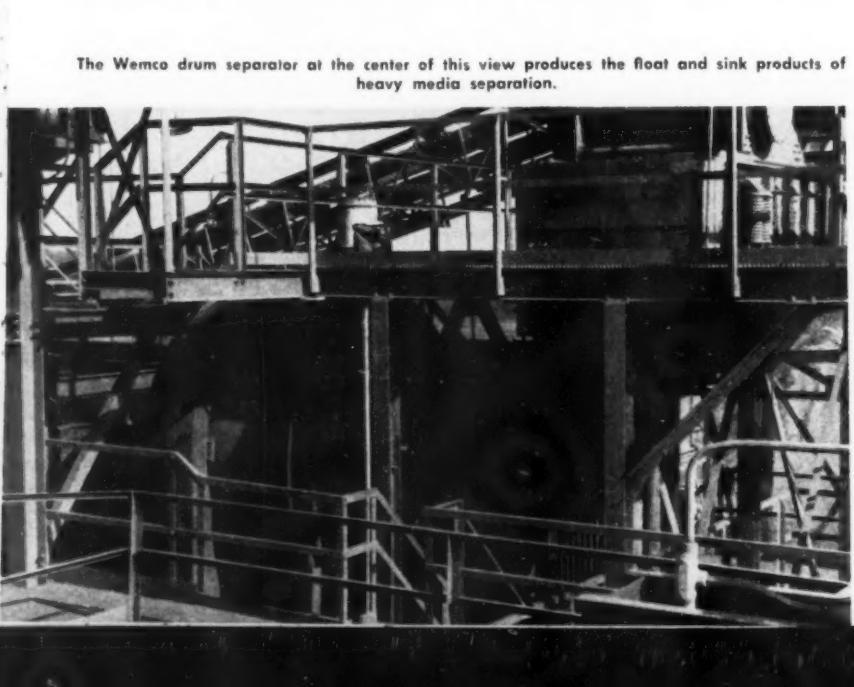
Many plants designed to treat low-grade ores are now in production and more are being built. However, these are, for the most part, designed to treat a single type of ore or ores from a single mine, which offers sufficient reserves to amortize the first cost of the plant and leave a profit margin. Smaller properties and mines with a number of different kinds of ore, each requiring somewhat different methods of treatment, do not justify the cost of separate plants. E. W. Coons Company and the Pacific Isle Mining Company both had such properties located in the area near Eveleth, Minnesota on the east end of the Mesabi Range. The two companies joined efforts and engaged the Western Knapp Engineering Company, a division of the Western Machinery Company, to design a plant with an hourly capacity of 300 tons of crude ore.

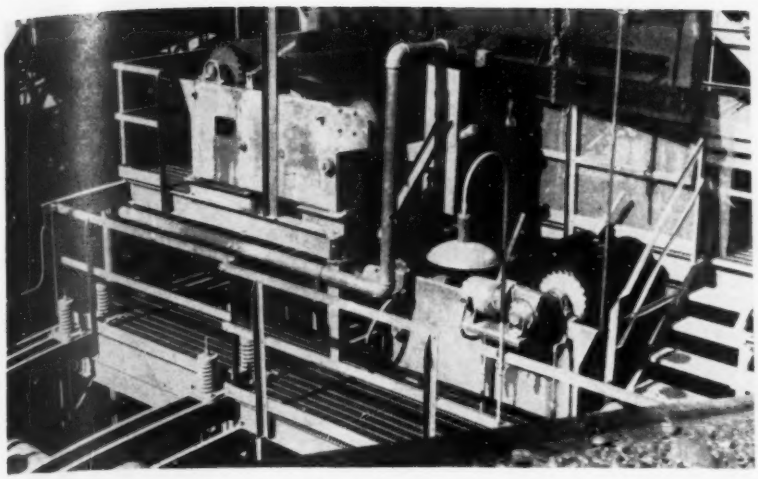
Designed for Flexibility

Specifications demanded that the plant be equipped to handle and treat a variety of ores separately. In other words, the plant was to be designed so that it could treat ores requiring nearly any kind of treatment from simple scalping or screening to screening, washing, Heavy Media Separation, jigging, hydroseparation, and spiraling. In effect, the plant would be a custom mill. The plant was patterned after Pacific-Isle's North Uno concentrator located near Hibbing, Minnesota, which had been concentrating ores from Pacific Isle's properties on the central Mesabi Range since 1949.

Construction by the E. W. Coons Company was finished in 1952 and during the operating season the plant treated ores from nine mines. Included in this group are three Coons properties—the Sydney, the Julia, and the Genoa-Sparta mines—and six Pacific Isle mines—the Emmett, Wacootah, Missabe Mountain, Drew, Croxton-Syme, and Graham. Ore from each is given individual treatment and both the ores and the concentrates therefrom are handled and stored separately in rail cars; no stockpiles are used for storage, al-

The Wemco drum separator at the center of this view produces the float and sink products of heavy media separation.





RIGHT: The secondary crushing and washing section of the plant. Components include a double-deck Hewitt-Robins screen, a Symons shorthead cone crusher, a Tyrock screen, and a Wemco classifier. ABOVE: The Dings magnetic separator at the top left cleans media washed from float and sink products. The tailing from this separator is given a second and final cleaning in the Dings separator at the bottom right.

though provision has been made to stockpile concentrates.

Five Benefication Methods

The plant flowsheet contains five methods of beneficiation—scalping, washing, Heavy Media Separation, jigging, and spiralling—and has been designed so that at any time any size fraction may be rejected, sent to a concentrating section, or loaded as a concentrate. In essence, the entire plant has the flexibility of a laboratory.

Crush-Screen-Wash

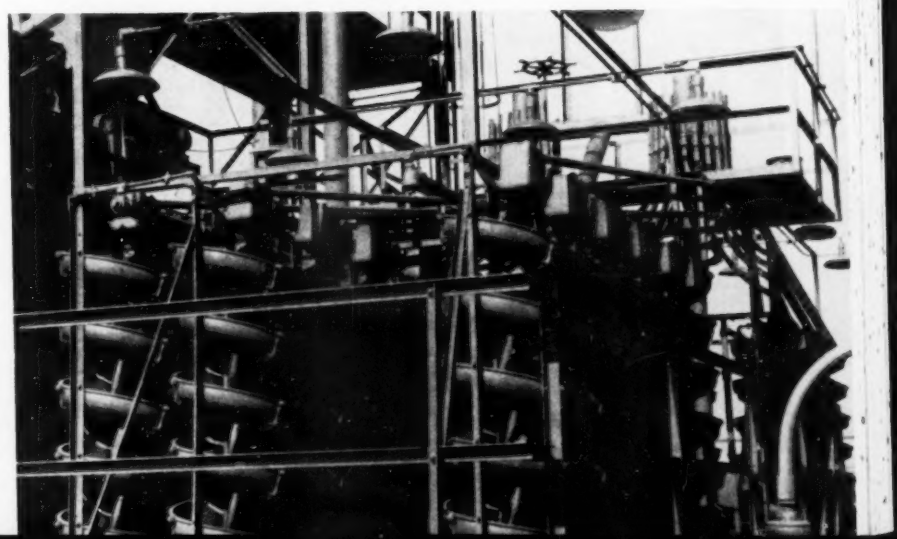
Railroad cars carrying the type of ore to be treated are spotted over a 60-ton receiving bin and unloaded. An Allis-Chalmers car shaker is used on the cars only when the ore does not run freely. From the receiving bin, ore is carried by a 48-inch by 10-foot Bathke manganese steel feeder and a 48-inch belt conveyor to a 5- by 12-foot Hewitt-Robins vibrating screen with 5-inch openings. Oversize is crushed in a 30- by 42-inch Pioneer jaw crusher and either removed from the circuit to a 90-ton reject bin and then trucked to the reject dump, or joined with the undersize. The minus-5-inch crude is carried by a 48-inch by 10-foot Bathke plate feeder and a 30-inch belt conveyor, which has a 30-inch MEMCo suspended electromagnet to remove tramp iron at the discharge end, to a 5- by 12-foot double-deck Hewitt-Robins Gyrex screen. Here the ore is wet screened and separated into three fractions: plus-1½-inch which is crushed in a 4-foot Symons standard cone crusher; minus-1½-inch, plus-¼-inch; and minus-¼-inch. The two coarser fractions are combined and again wet screened on a 6- by 12-foot Tyrock screen with ¼-inch openings.

The coarse fraction (minus-1½-inches, plus-¼-inch) from this second washing screen is sent either to concentrate loading as coarse wash ore, or, by two 24-inch belt conveyors, to a 5- by 12-foot Hewitt-Robins Elliptex double-deck washing screen ahead of the Heavy Media Separation section. The fine fraction (minus-¼-inch) from this screen is combined with the fine fractions from the two screens in the washing section and treated in a 60-inch by 23-foot Wemco classifier. Overflow from this primary classifier is pumped by an 8-inch Wemco pump to a hydroseparator at the head of the spiral section, and the rake product is conveyed by 24-inch belt conveyors either directly to concentrate loading as wash ore or to the feed-bin at the head of the jig section.

HMS Section

The two coarse fractions (minus-1½-inches, plus-¾-inch; and minus-¾-inch, plus-¼-inch) from the screen at the head of the HMS section are combined and fed to an 8- by 6-foot Wemco drum separator. Ferro-silicon is mixed with the pulp and affords the medium of separation in the drum. No exact figures

Thirty-six 5-turn Humphrey spirals are used to produce the rougher products of the spiraling section.



A 30-inch belt with a Conveyoflo meter housed in the building at the right carries reject product to this 90-ton bin from which it is loaded in Koehring Dumptors and trucked to the reject dump in the background.

This inclined 48-inch belt conveyor takes ore from the unloading bin to the top of crushing and scalping section.

on the amount of media used per ton of feed are available because the difference in the characteristics of the various types of ore processed result in varying media consumption.

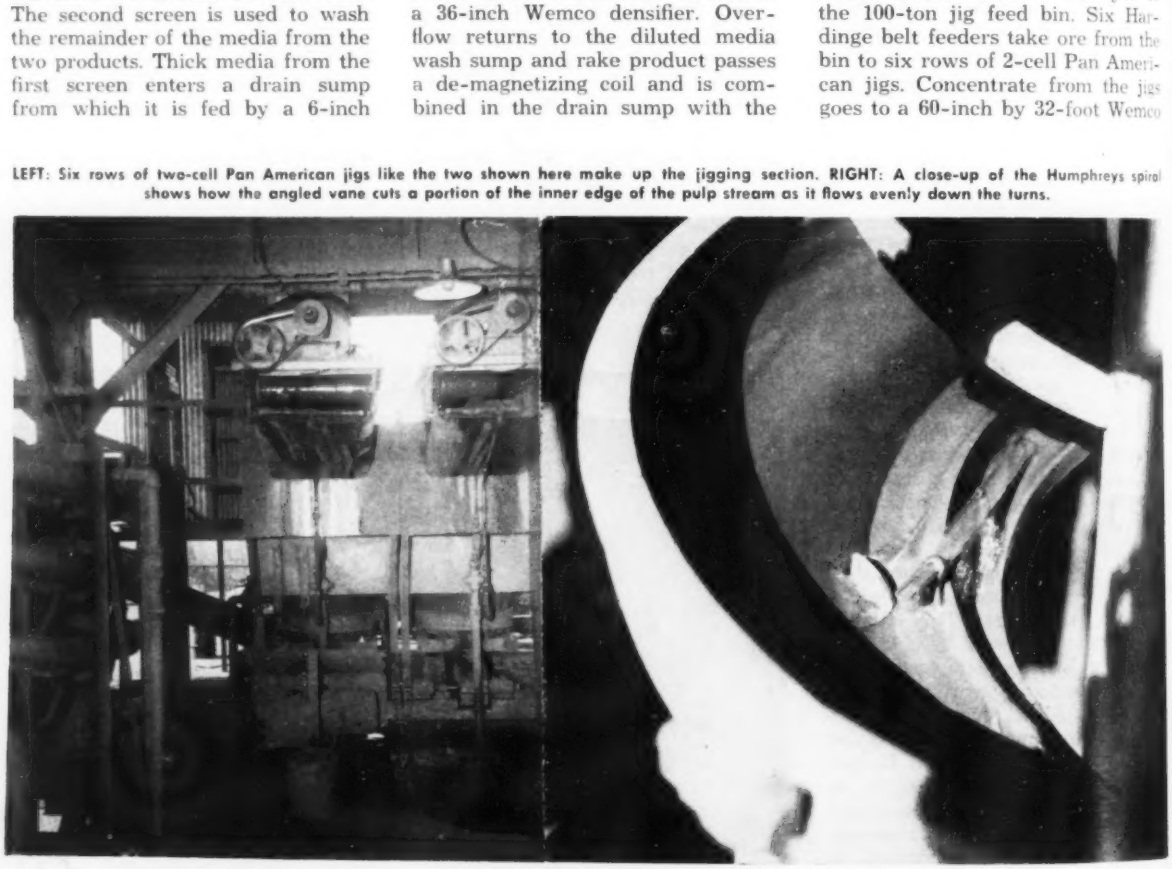
Two 6- by 12-foot Hewitt-Robins divided Elliptex screens follow the drum separator in series. The first acts as a drain screen separating the media from the float and sink products; float is handled on one half of the screen and sink on the other. The second screen is used to wash the remainder of the media from the two products. Thick media from the first screen enters a drain sump from which it is fed by a 6-inch centrifugal Wemco pump back to the drum separator as make-up media. Diluted media from the second screen enters a wash sump and is pumped by a 4-inch Wemco centrifugal to a 48-inch Dings magnetic separator. Sands from this unit feed a second 36-inch Dings magnetic separator and sands from the second go to the primary washing classifier. The cleaned media from both separators are combined and treated in a 36-inch Wemco densifier. Overflow returns to the diluted media wash sump and rake product passes a de-magnetizing coil and is combined in the drain sump with the thick media from the drain screen.

Final float product from the wash screen is rejected from the circuit and the sink product is finished concentrate fed by a 30-inch belt conveyor to the loading bin.

Pan American Jig Section

Feed for the jig section is the rake product from the primary classifier, carried by 24-inch belt conveyors and a 24-inch shuttle conveyor to the 100-ton jig feed bin. Six Hardinge belt feeders take ore from the bin to six rows of 2-cell Pan American jigs. Concentrate from the jigs goes to a 60-inch by 32-foot Wemco

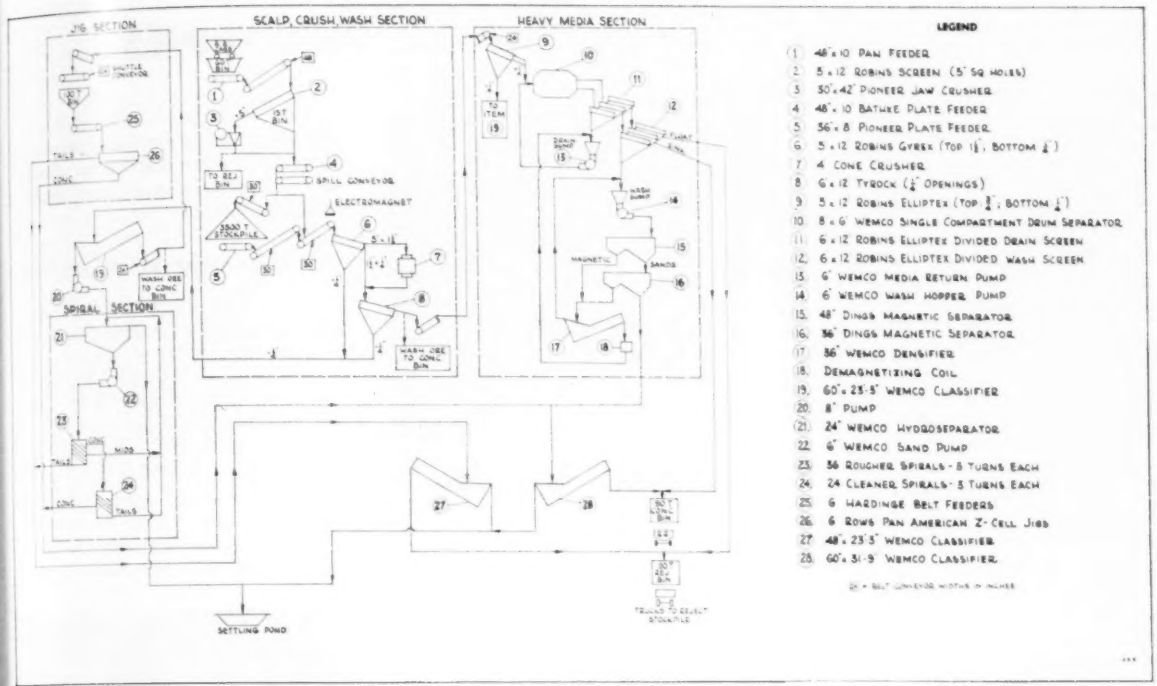
LEFT: Six rows of two-cell Pan American jigs like the two shown here make up the jigging section. RIGHT: A close-up of the Humphreys spiral shows how the angled vane cuts a portion of the inner edge of the pulp stream as it flows evenly down the turns.



FLOWSHEET COONS PACIFIC IRON CONCENTRATOR

EVELETH, MINNESOTA

Rated Capacity 300 Tons Concentrate Per Hour


JIG SECTION
SCALP, CRUSH, WASH SECTION
HEAVY MEDIA SECTION
SPIRAL SECTION
SETTLING POND
LEGEND
(1) 48" x 10' PAN FEEDER
(2) 5' x 12' ROBINS SCREEN (5" SQ HOLES)
(3) 50" x 42" PIONEER JAW CRUSHER
(4) 48" x 10' BATHKE PLATE FEEDER
(5) 36" x 8' PIONEER PLATE FEEDER
(6) 5' x 12' ROBINS GYREX (TOP 1½", BOTTOM ¾")
(7) 4' CONE CRUSHER
(8) 6' x 12' TYROCK (½" OPENINGS)
(9) 5' x 12' ROBINS ELLIPTEX (TOP ¾", BOTTOM ¼")
(10) 8' x 6' WEMCO SINGLE COMPARTMENT DRUM SEPARATOR
(11) 6' x 12' ROBINS ELLIPTEX DIVIDED DRAIN SCREEN
(12) 6' x 12' ROBINS ELLIPTEX DIVIDED WASH SCREEN
(13) 6" WEMCO MEDIA RETURN PUMP
(14) 6" WEMCO WASH HOPPER PUMP
(15) 48" DINGS MAGNETIC SEPARATOR
(16) 36" DINGS MAGNETIC SEPARATOR
(17) 36" WEMCO DENSIFIER
(18) DEMAGNETIZING COIL
(19) 60" x 23'-5" WEMCO CLASSIFIER
(20) 8" PUMP
(21) 24" WEMCO HYDROSEPARATOR
(22) 6" WEMCO SAND PUMP
(23) 36 ROUGHER SPIRALS - 5 TURNS EACH
(24) 24 CLEANER SPIRALS - 3 TURNS EACH
(25) 6 HARDINGE BELT FEEDERS
(26) 6 ROWS PAN AMERICAN Z-CELL JIGS
(27) 48" x 23'-5" WEMCO CLASSIFIER
(28) 60" x 31'-9" WEMCO CLASSIFIER

classifier. Final jig concentrate is the rake product from this classifier and is carried to the loading bin by a 30-inch belt conveyor.

Tailing from the jigs is fed to a 48-inch by 23-foot Wemco classifier for dewatering. Overflow from this classifier combines with overflow from the concentrate classifier and goes to a settling pond. Sand from the tailing classifier is conveyed by a 24-inch belt to the reject bin, from which it is trucked to the reject stockpile.

Spirals Treat Fines

Overflow from the primary classifier (in the washing section) is fed to a 24-foot Wemco hydroseparator at the head of the spiral section. Separator overflow goes to the settling pond and underflow feeds through a 6-inch Wemco pump to 36 5-turn primary Humphreys spirals. Rougher concentrate from the primary section feeds 24 3-turn secondary spirals. Cleaned product from the secondaries goes to the concentrate classifier in the jig section for dewatering.

Rougher (primary) middling joins the cleaner (secondary) tailing and is fed back to the hydroseparator. Rougher tailing is dewatered in the tailing classifier before rejection.

It should be noted that five separate methods of treatment are provided in the Coons-Pacific concentrator—scalping, washing, Heavy Media Separation, jigging, and spiralling. In all, five different types of product can be made in these five sections: (1) wash ore, (2) coarse wash ore, (3) HMS concentrate, (4) jig concentrate, and (5) spiral concentrate. The flow sheet for each ore treated can provide as needed nearly any combination of the various methods of beneficiation.

Two waste products are produced —tailing that is impounded in a settling pond, and coarse reject trucked with Koehring Dumptors to a reject dump adjacent to the plant site.

An Allis-Chalmers car shaker is used in unloading the railroad cars that bring crude ore to the plant. The electric car wrench to the right of the car was built in the E. W. Coons shop and is used to open and close the car doors.

SECOND HMS UNIT WILL DOUBLE REFRACTORY CHROMITE OUTPUT AT MASINLOC, PHILIPPINES

In the Philippines when you mention Masinloc you are generally talking about chromite because one of the largest chromite deposits in the world is located in the municipality of Masinloc in the Zambales mountains of western Luzon, 75 miles northwest of Manila.

In the metallurgical world when you mention Masinloc one generally thinks of refractory-grade chrome because the chances are five to one that the chrome you are using comes from Masinloc.

Masinloc is also a mine owned by Consolidated Mines, Inc., currently being operated on contract by Benguet Consolidated Mining Co. Work was first started in the early 1930's, but during those years gold was king and any kind of base metal operation was looked upon as a poor stepchild, tolerated only because some engineers had vision and faith. In the case of Masinloc, both vision and faith have been more than justified.

From the run-down condition of the property during the late 1930's, one of the most efficient and streamlined operations in the Orient has been developed. Excellent quarters are furnished for both staff and laborers. Emphasis is placed on the training of Filipino engineers to fill key positions.

At one time, the Communist-led Hukbalahaps caused considerable trouble. This situation necessitated creation of a strong security guard

Virgil E. Frank (left) is general superintendent of the Consolidated Mines contract for Benguet Consolidated Mining Company. With him is B. Koresseman, Masinloc mechanical superintendent. All photographs used with this article were taken by Lee Hinckley.

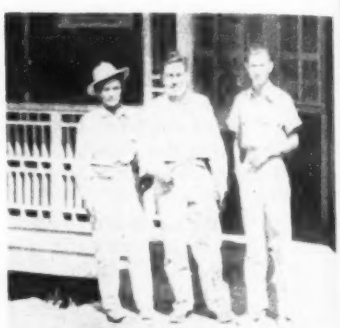
by Benguet Consolidated Mining Co. to assist a company of Filipino soldiers stationed at the property by the Philippine Government. Shortly thereafter living conditions returned to a degree of normalcy.

Open-Pit Mine

Mining is done by open pit with the ratio of waste to ore being approximately one to one. Two products are produced from the mine: lump ore which is hand-sorted and shipped without beneficiation, and mill feed which is trucked to the beneficiation plant, a distance of about 1½ kilometers from the pit. Ore reserves are maintained at about 8,000,000 tons.

Ore Treatment: Wash and HMS

Ore trucks dump over an eight-inch grizzly. Ore is then transported to a wet vibrating screen by means of a belt conveyor. Openings on the first deck of the screen are 1⅞ inches. Washed oversize passes over a sorting belt where the waste is hand-picked. The ore, which is designated as "washed lump," goes to a bin for shipment. The minus-1⅞-inch material falls onto another wet vibrating screen with ½-inch openings



Pictured at the Masinloc chrome mine from left to right are Jose Caledron, open-pit mine foreman; M. Aycardo, Jr., chairman, Philippine Islands Board of Examiners for mining engineers; and R. A. Besa, mill superintendent.

LEFT: The Masinloc washing and HMS plant at Masinloc, Zambales, Philippine Islands, is being doubled in size. Construction for the new HMS unit is shown at the right. RIGHT: Panoramic view of the Masinloc beneficiation plant.

the plus-½-inch material goes to a storage bin and the undersize falls onto another screen with 3/16-inch openings. The oversize goes to the same bin as the plus-½-inch material and the minus-3/16-inch goes to a spiral classifier. The two decks are used on the vibrating screen to facilitate washing. The classifier produces a sand which is designated as minus-4-mesh concentrate. This carries a high chrome content, and at the present time is being stockpiled pending perfection of a treatment method. The overflow from the classifier goes to waste. The plus-3/16-inch minus-1 7/8-inch portion goes to a heavy media separation plant.

New Railroad To Speed Shipping

Chromite produced is of refractory grade and products shipped average 32.0 percent Cr_2O_3 and 5.0 percent SiO_2. Accountability by weight of mill products follows:

Product	Percent
Feed	100
Washed lump	15
Heavy media ore	33
Minus 4-mesh product*	25
Waste	27

*Now being stockpiled

Houses are provided for the Filipino workmen.

Shipments average around 45,000 tons per month. Haulage from the mine to the Port of Masinloc, a distance of approximately 30 kilometers, is by truck. A narrow gauge railway is under construction and should be finished by the end of the year. Loading at the port is by belt conveyor at the rate of 200 tons per hour.

Another HMS unit is being installed which will about double capacity.

Marino Olondriz is president of Consolidated Mines, Inc.; John W. Haussermann is president and general manager of Benguet Consolidated Mining Co.; R. W. Crosby is vice president and assistant general manager of Benguet Consolidated Mining Co.; A. P. Davidson is assistant general superintendent of Benguet Consolidated Mining Co.; and Virgil E. Frank is general superintendent of Benguet Consolidated Mining Co.—Consolidated Mines contract.

LEFT: Ore truck dumping into the mill ore bin. The Hukbalahaps are still a nuisance. Note the guard tower armed with 50-caliber machine guns and electric searchlight on roof. RIGHT: Ship loading chrome concentrate at Masinloc port.

LEFT: Upper bench of the open-pit chrome mine. All ore is hauled to the concentrating plant by contract truckers. RIGHT: Note the soft easily loaded chromite in the bank of the open-pit mine.

LEFT: W. R. Webb, manager. TOP RIGHT: R. G. Fleck, assistant manager. BOTTOM RIGHT: R. E. Durocher, plant metallurgist.

STAR LAKE'S MANAGEMENT TEAM

Rear dump 22-ton Euclid trucks back under the shovel dipper fast . . . get away fast, and dump fast.

The test of management is what it does. These are a few of the changes and improvements that this management has made in the last four years:

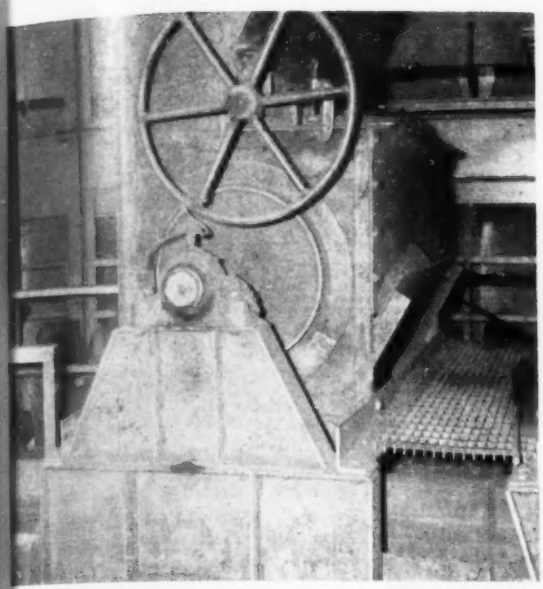
In one of the first changes, Mr. Webb and his men sectionalized the magnetite mill. Now, each rod mill works with its own definite one-third of the milling equipment; when one circuit breaks down, the other two keep working. Before, each piece of equipment worked with the rest of the mill; and isolating trouble was tough.

On the ore haul, they substituted rear-dump trucks for side-dumpers. The results were amazing: Formerly, 11 or 12 30-ton side dumpers were kept busy full time; J&L thus had an average of 345 (11.5 times 30) tons of truck capacity in use. Now, six or seven 22-ton rear-dumpers do the same job, so the company is using only 143 tons (6.5 times 22) tons of truck capacity. Because they are faster and more maneuverable, the rear-dumpers are saving time in every operation—loading, hauling, dumping, and return-hauling.

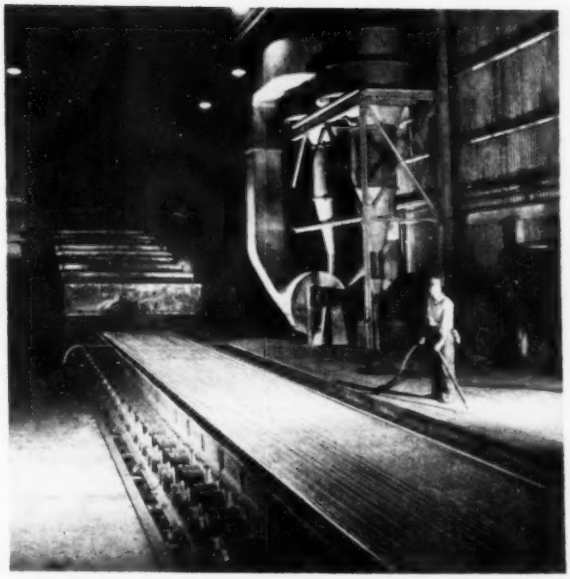
They added a fourth stage of crushing; it increased mill capacity by about eight or nine percent.

They replaced two overloaded 36-inch belts with a single 48-inch steel-cord belt. The two 36-inch belts were each about 375 feet long, climbing steeply. The 48-inch conveyor is 750 feet long; it has greater capacity, uses less power, gives less trouble. Here's how Master Mechanic Paul Versteeg installed it with only five days' downtime: His men changed one section of idlers each day; that left the 36-inch belts running on 48-inch idlers. Then, during a final changeover which required only five days, they eliminated the transfer point and installed the 48-inch belt.

Another big change is the new sinter plant. It's typical of the way Star Lake's management operates. They have re-engineered the sintering process from one end to the other—and have improved it from one end to the other.



The roll feeder is simply a rotating steel roll. Hearth mix comes through a series of baffles, falls on the roll, and is spread on the pallet.



Sinter leaves via the hooded cooling zone, which gets cool air from outside building. At right are small hot cyclones for collecting particles before they arrive at blowers.

NEW HEARTH CHARGE ASSURES J&L A BETTER, MORE UNIFORM SINTER

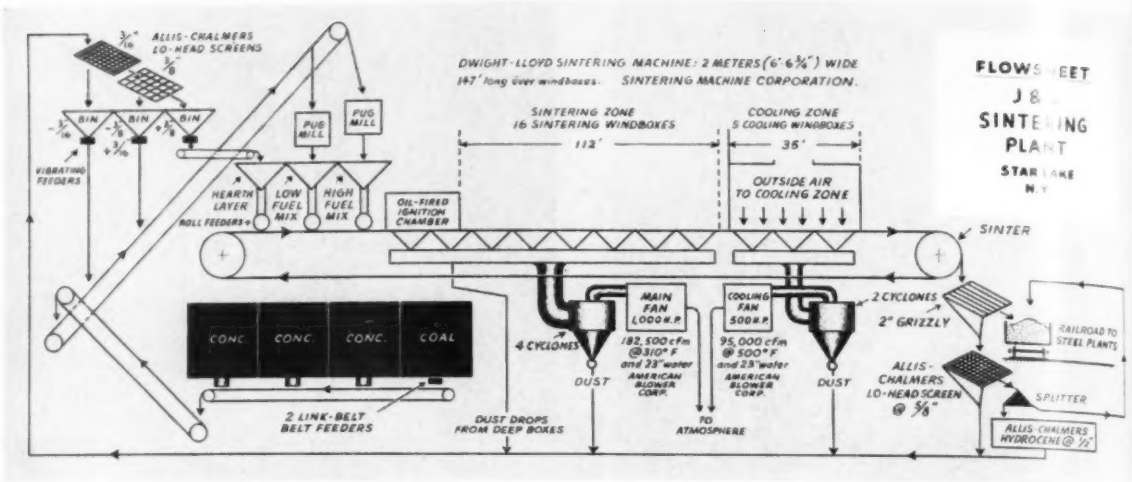
By Howard L. Waldron
New York District Manager
MINING WORLD

As a process, sintering had been static for many years. Jones & Laughlin Steel Corporation changed that when it built the new sinter plant at Star Lake, New York.

This new plant, which went into operation in August 1952, incorporates a great many new ideas. Many of them came from J&L's men. And many others came from Sintering Machinery Corporation which designed and constructed the new Dwight-Lloyd sintering machine to meet J&L's problems. These ideas range all the way from J&L's method of storing concentrate (in heated double-wall silos) to a new method of cooling sinter (on a special cooling section of the sintering machine).

Ralph West, sinter plant foreman, watches the charge as it passes from the ignition chamber.

Aerial view of the Star Lake operations. Open-pit mine in background, concentration plant at right, and the sinter plant at left. The tailing pond is barely visible in left foreground.



Control panel for sintering plant has flowsheet, start-stop buttons, and signal lights.

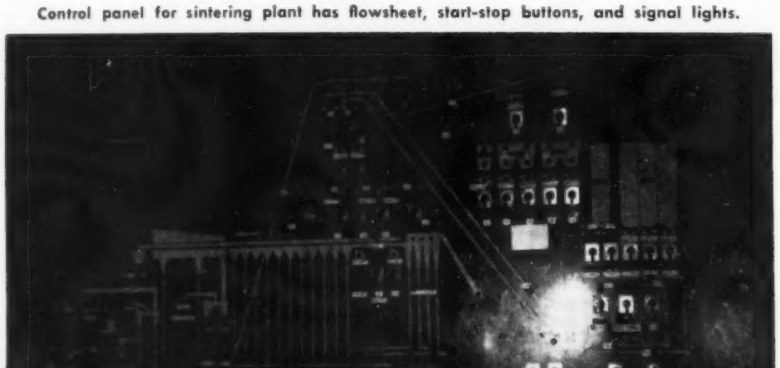
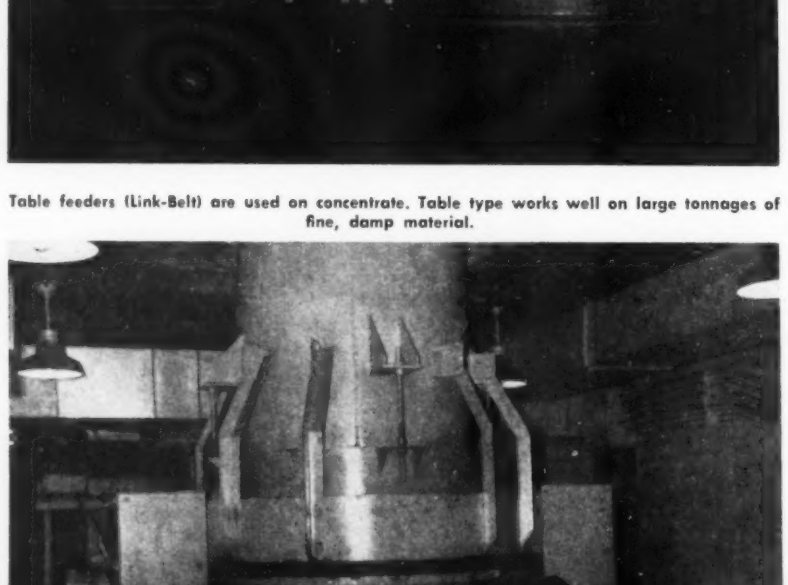


Table feeders (Link-Belt) are used on concentrate. Table type works well on large tonnages of fine, damp material.



In total, they add up to better, easier more uniform sintering.

The new plant has a capacity of about 1,200 tons of sinter per day. Feed to this plant comes mainly (about 900 tons per day) from Star Lake's new martite plant described in June 1953 MINING WORLD, pages 38 to 42. The remainder, 300 tons per day, comes from the magnetite plant. Purpose of sintering is to fuse the sand-sized iron concentrate into chunky pieces for charging to the blast furnace. It also changes the iron concentrate chemically—practically eliminates the sulphur, and reduces iron content about 0.9 percent (mainly through dilution by ash contained in the coal).

Features of New Plant

Now, let's take a look at the new features of J&L's new plant:

Double-wall silos prevent freezing of damp concentrate or coal. Hot-air heaters, near the bottom, send warm air up and between the double walls; they are regulated to keep temperature in the silo higher than 32° F at all times.

The new hearth charge consists of three layers as opposed to the single uniform layer in a conventional plant. The three-layer system cuts fuel consumption about 20 percent and also prolongs the life of hearth pallets.

Coal used in both systems is No. 3 (buckwheat size) anthracite. Here's the way the new charge works:

The high-fuel layer contains the same amount of coal as in a conventional plant—enough to fuse the top layer properly. The center, low-fuel layer needs less fuel; it gets some of its heat from hot gas which comes from the high-fuel layer above. The hearth layer contains no coal; it prevents hot sinter from coming in contact with the grate bars.

Roll feeders are used to distribute charge on the pallets. Sinter plant foreman Ralph West says "they do a better job, and are much quieter than the old swinging spout with a ball to jar material loose from inside the spout."

Improved Sintering Machine

The Dwight-Lloyd sintering machine has been improved over previous models. One important new feature is a lubricated, metal-to-metal seal at the side, between the moving pallets and windboxes; the seal is counter-weighted to allow control of pressure between the mating members (seal bars); as a result, leakage is cut almost to zero, higher gas volumes pass through the sinter, and plant efficiency is stepped up. Another feature is improved pallet handling: The discharge end provides for a cleaner, quicker split of pallets and sinter.*

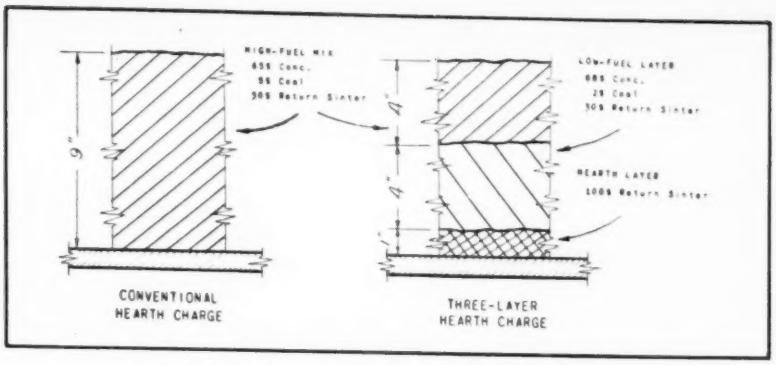
At two meters wide (6 feet, 6¾ inches), this is the widest machine in the steel industry. Next widest: 6 feet.

The cooling zone (35 feet of extra length cooled by air from outside the building) is a new idea. In this zone, air passes through the sinter at about 50 percent greater velocity than in the sintering zone. The result is that sinter is air-cooled to about 400° F., and so is easier on grizzlies, ore cars, and equipment in the return-sinter circuit. Also, the sinter has better physical structure.

Position of the line between sintering and cooling zones can be varied by the operator. In an emergency, for instance, the entire 147 feet could be used for sintering; the machine would be speeded up and output would be higher.

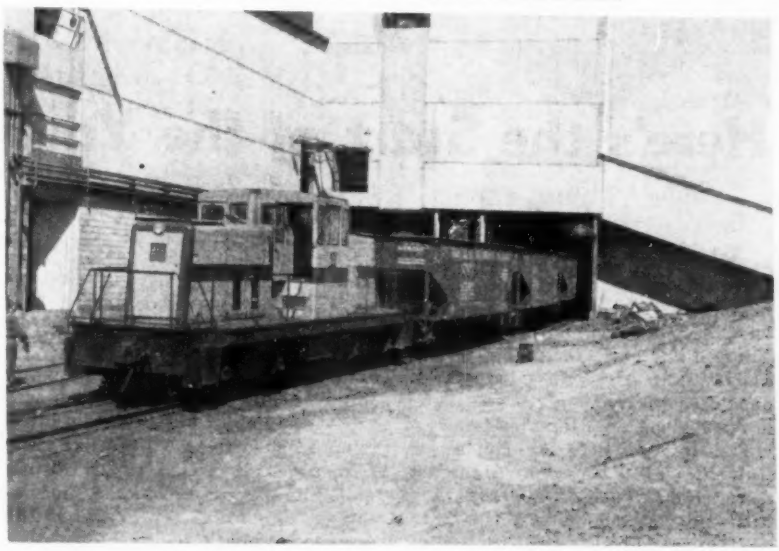
J&L's designers looked on return sinter as an important physical part of the charge. They provided a system for crushing, sizing, and returning it for blending with the charge. This return-sinter system provides a means as in all sintering plants of resintering fines which would blow away in the blast furnace. But more importantly, it provides a deliberately increased amount of return sinter for blending into the charge. This sized return sinter increases the porosity of the charge, and thus allows more air to flow through the bed. And since the sintering rate is roughly proportional to the amount of air going through the bed, increased porosity means increased sintering capacity.

* Further information on this equipment can be obtained from Sintering Machinery Corp., Netcong, New Jersey.

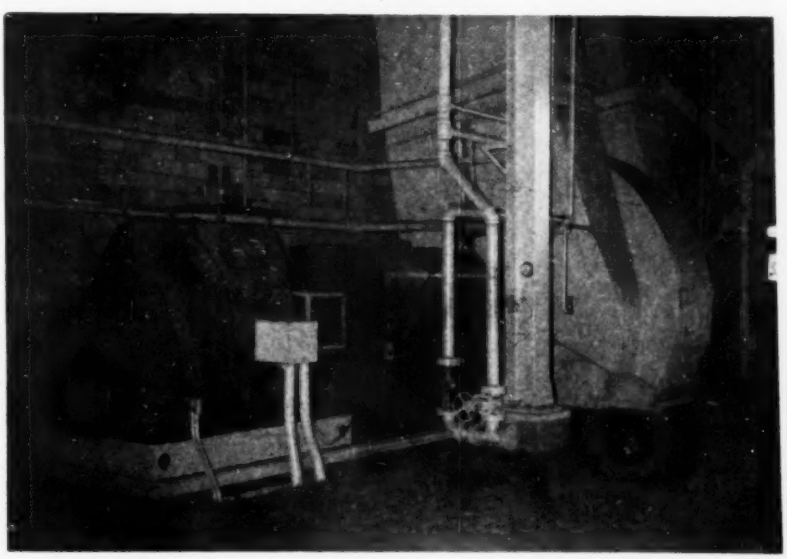


Typical cross sections of the old and new hearth charges.

Sinter for Pittsburgh: This General Electric 470-horsepower Diesel-electric locomotive switches a string of gondola cars each loaded with 70 tons of sinter.



Big fan exhausts air from sintering zone. Motor (left) is a Westinghouse 1,000-horsepower synchronous motor. The drive is through a Gyrol Fluid Drive to a 1,000-horsepower American Blower Corporation fan.



LEFT: Caterpillar D-6 breaks ground for the substation at Young mine. M. J. Langley, superintendent of mines (left), gives instructions to operator. RIGHT: Headframe will be to left of big tree near clump of low trees. Stakes for other buildings in surface plant are also visible.

Here's the Start of the Young Mine

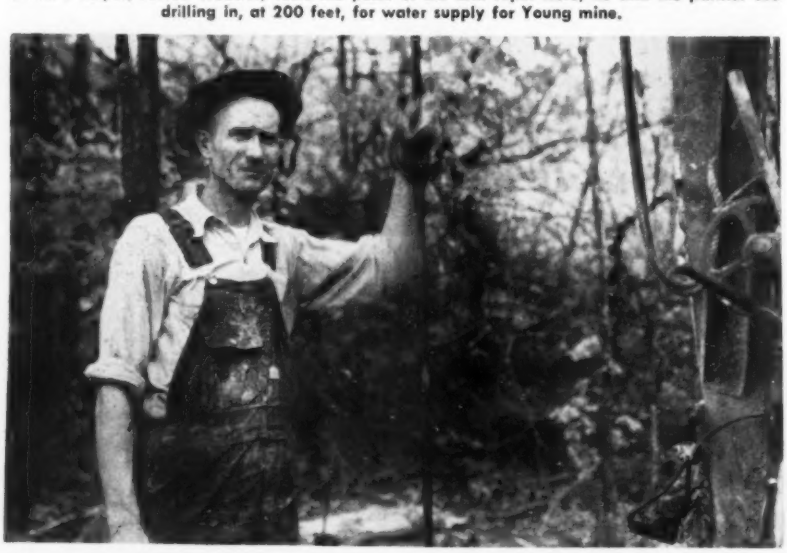
American Zinc Company of Tennessee started clearing off the surface at the location of its new Young mine early in April. The ore body was discovered in 1951 and a development program has been underway since that time.

The mine, which is named for Howard I. Young, president of American Zinc, Lead and Smelting Company, is scheduled to go into production about September of 1954; it will reach capacity output late in 1955 or early in 1956, at about 4,000 tons of ore daily. It is near the village of New Market in eastern Tennessee.

The ore body is a large, slightly dipping, inverted saucer at about 700 feet depth. It, like the other zinc ore bodies at Mascot, is in the Kingsport formation of the Knox dolomite. American Zinc has not released dimensions or grade of the ore body, but it has disclosed that the Young has reserves equivalent to more than 1,000,000 tons of zinc concentrate (or 1,200,000 pounds of recoverable zinc metal).

The first shaft, to be known as the Howard, will be rectangular, about 15 by 26 feet rock size, with one of the cages large enough to carry medium-sized Diesel-powered equipment (tractors and trucks) underground without dismantling. The shaft will bottom at about 900 feet. Development workings, near the 700-foot level, will lead out along the slightly dipping structure (average 7° or so). The mine will be Dieselized, and will use equipment similar to that which American Zinc has proved at its other properties.

Driller's helper, Alfred Webster, feels the pulse of his drill rope. Here, he and his partner are drilling in, at 200 feet, for water supply for Young mine.



New Mill in Future

Eventually a new mill will be built near the Young mine to handle all its output, but for the next few years ores will be hauled by railroad to the company's Mascot mill.

A big asset to the company is the east-Tennessee miner. These men (like Mr. Webster, shown at left) have worked Mascot since it started. Today, many of them are third-generation miners. Many have farms nearby in the fertile rolling hills. They have a mining tradition, know what a mule in a mine is, but know more about drift jumbos and mucking machines.

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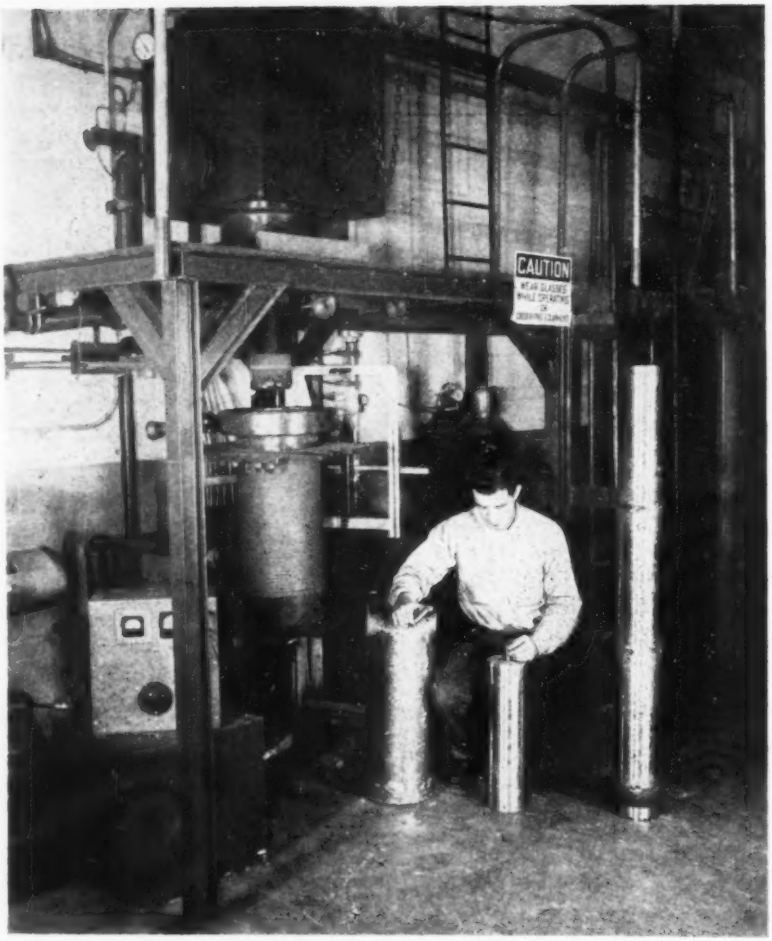


This view shows the melting furnace, disassembled, with the spent end of a consumable electrode suspended over the 10-inch, water cooled, copper crucible. The 10-inch ingot on the operator's right was made by melting six-inch ingots. The six-inch ingots are joined mechanically for strength and heliarc welded to provide good electrical contacts.

zirconium
ATOMIC POWER METAL

Production problems solved, costs cut to $50 per pound of metal for use in new nuclear reactor submarine engines

By A. H. Roberson*

Many metals considered to be rare a few years ago are playing important roles in today's fast moving technology. Perhaps the newest and certainly one of the most important of these "rare" metals is zirconium. Although the element was discovered by Klaproth in 1789 it was not prepared in a state of high purity until 1925 when Van Arkel and his coworkers at the University of Leyden and the Phillips Lamp Works in Eindhoven, Netherlands, prepared the pure metal by decomposing the iodide on a hot tungsten wire.

Zirconium is the ninth most common metal in the earth's crust, which makes it more plentiful than nickel, lead, copper, or zinc. The principal ore is zircon ($ZrSiO_4$) which is widely distributed. The best known deposits occur as beach sands in Australia, India, Africa, and North and South America. Although the beach sands of Australia and India are by far the world's richest deposits, the principal supply of zircon is produced from the Florida beaches as a byproduct of ilmenite recovery.[1] A considerable tonnage also is recovered by the monazite dredging operations in central Idaho. An important source, at present unexploited, is located on the Oregon beaches near Coquille.

Baddleyite (ZrO_2) occurs in Brazil, where nearly 2,000,000 tons of ore containing from 70 to 90 percent ZrO_2 have been proved. Domestic production is consumed mainly by the refractory and chemical industries, which use 20,000 to 30,000 tons per year. Present market quotations indicate a price of $40.00 per ton for zircon concentrate (65 percent ZrO_2), c.iif. Atlantic seaboard. Unfavorable freight rate differentials make it very difficult for western producers to meet the competition of the Florida deposits.

Production Problems

The production of ductile zirconium metal is an expensive and difficult process. The metal is extremely reactive at high temperatures, and it combines with oxygen and nitrogen so avidly that its reduction must be conducted in the complete absence of air. The presence of 0.2 percent oxygen makes the metal so brittle that it is useless. Similar amounts of nitrogen likewise embrittle the metal.

Several methods have been suggested for producing the ductile metal. The electrolysis of alkali double fluorides in fused salts baths is a distinct possibility, although oxygen contamination from the leaching steps necessary to separate the metal from the electrolyte often is so serious that the metal is rendered useless.

The reduction of the oxide with purified calcium has been tried and is entirely feasible. The chief disadvantage of this method lies in the expense and difficulty in obtaining the extremely pure calcium necessary to prevent contamination by oxygen.

The Van Arkel or "iodide" process was first developed commercially at the Phillips Lamp Works in Holland and later adopted in the United States by the Foote Mineral Company as a commercial process. The United States Atomic Energy Commission recently announced that the

*Chief, Technical Services Branch, Northwest Electrodevelopment Laboratory, U. S. Bureau of Mines, Albany, Oregon.

1. See MINING WORLD, May 1953, pp. 40 to 43.

Westinghouse Electric Company had used the process to produce metal for the AEC.

The process involves dissociation of zirconium iodide by a glowing wire. Iodine crystals and crude zirconium metal are placed in glass or corrosion-resistant metal containers, and a tungsten or zirconium filament is suspended from the top of the container, which is evacuated to about one micron and externally heated to about 300° C. The iodine vapor reacts with the zirconium and then rises to the glowing filament where the iodide is decomposed. The zirconium clings to the filament and the iodine reacts with more of the crude metal.

The size of the deposited rods is limited by the amount of current available for maintaining them at 1,400° C. To date the average finished rod is about 1 inch in diameter.

This material is very pure in the as-deposited form. However, the rods must be melted into ingots if sizable shapes are produced, and this may result in some contamination. Originally, the first metal produced in this country by the iodide process sold for about $650.00 per pound. Increased demand and improved production methods have resulted in the price being lowered to about $50.00 per pound.

Kroll Process Developed

In 1945 Dr. W. J. Kroll and his associates at the Northwest Electrodevelopment laboratory at Albany, Oregon devised a method which at present is used to produce the major portion of the nation's supply of this vital metal.

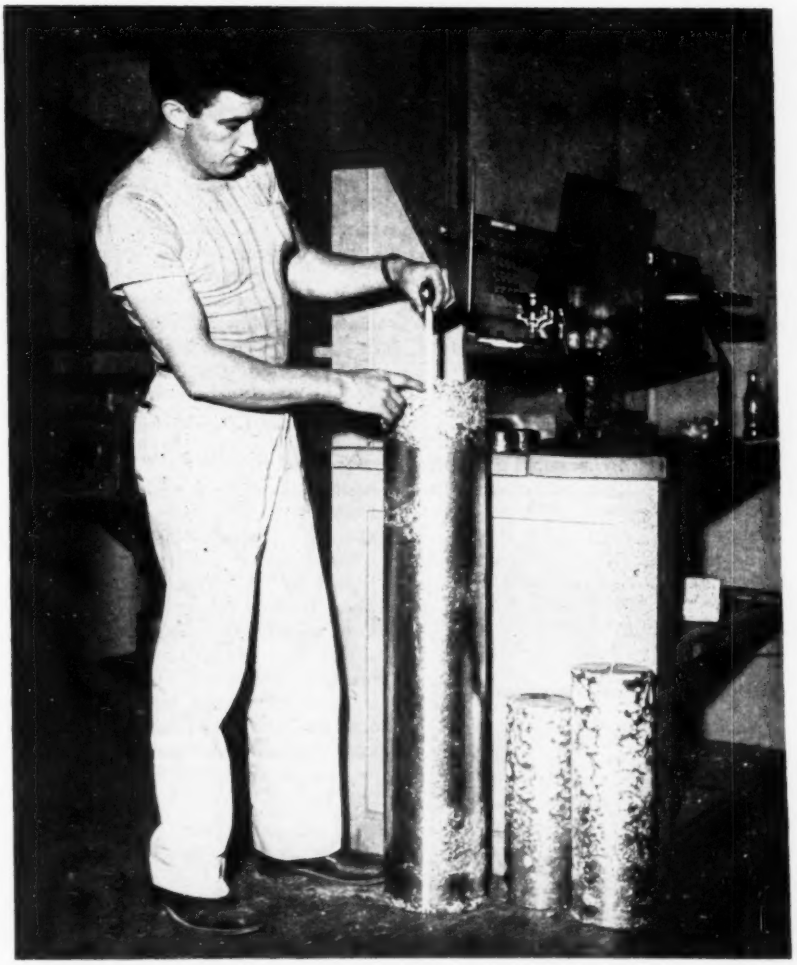
The process operates as follows: Zircon concentrates and carbon are fused in an arc furnace to produce zirconium carbide. Most of the silicon in the ore is eliminated during this step.

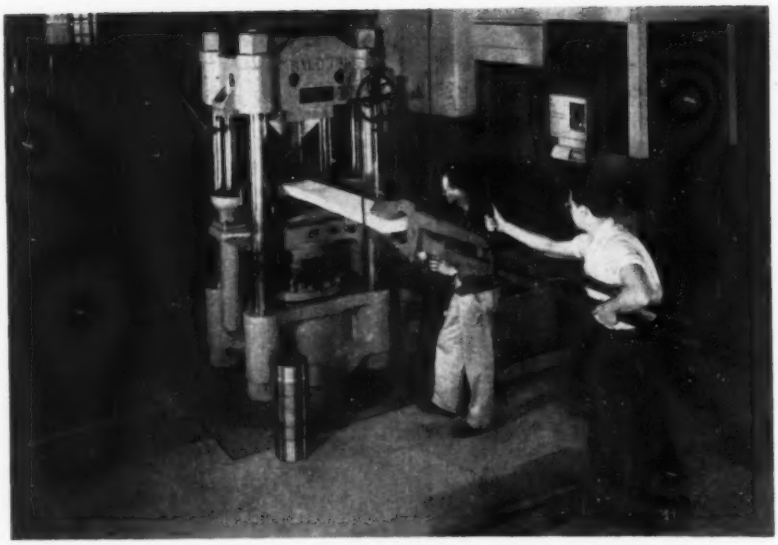
This material is placed in a shaft furnace and heated to 800° C, and chlorine is passed through the charge. Zirconium, iron, silicon and titanium chlorides are formed, the latter two being eliminated in the condenser where the temperature is controlled carefully. Zirconium and iron chlorides condense, while the other chlorides remain as gases and are caught in the scrubbing towers.

The condensed chloride is a coarse, yellowish-gray powder which fumes and decomposes in moist air to zirconium oxychloride ($ZrOCl_2$-$8H_2O$) and hydrochloric acid. This raw chloride is purified by volatilizing in a hydrogen atmosphere and

Zirconium castings. Left to right, machined ingot, valve body, bell with graphite mold and an injector body and nozzle to handle hydrochloric acid solutions. The welding on the valve body was done with heliarc, using a zirconium filler rod.

A 10-inch ingot before machining. This 500-pound ingot was produced by remelting six-inch ingots in a consumable electrode arc furnace.





Press forging a 300-pound zirconium bar. An unforged ingot is shown in front of the press.

collecting the volatile zirconium tetrachloride on water-cooled coils.

The purified chloride is dense and white and offers only a small surface for hydrolysis. The hydrogen atmosphere reduces the ferric chloride to the ferrous state, and since there is wide difference between the volatilization temperature of the two salts, iron is eliminated. Any $ZrOCl{\cdot}H_2O$ present in the raw chloride is dissociated to ZrO_2, while the HCl escapes.

Reduction is carried out in a helium atmosphere by passing the volatilized chloride over molten magnesium, where it is reduced to metallic zirconium and magnesium chloride. After the reaction is complete, the furnace is cooled and the reaction vessel is transferred to another furnace.

The inverted crucible is heated in a vacuum of about 50 microns to 900° C. Magnesium chloride melts and is drained off, any excess magnesium is distilled away, and the zirconium remains as a compact spongy mass.

In this condition zirconium is highly flammable, and special care must be taken to protect it until it is ready for melting.

Melting Problems Overcome

The high melting point of the metal coupled with its affinity for oxygen and nitrogen above 865° C, makes it a most difficult metal to handle, and it is necessary to do all melting in vacuum or under some inert gas such as helium or argon. Another perversity of the metal is evidenced by the fact that at its melting point it dissolves or reduces all of the known refractories. Originally U.S. Bureau of Mines metal was melted in carbon crucibles. Maximum carbon pickup was about 0.3 percent; this was not considered serious for most purposes, since the carbides were insoluble and were randomly scattered through the metal. More recently the sponge has been pressed into two-inch square bars, which are joined by welding and then melted as a consumable electrode into a water-cooled copper crucible. Ingots six inches in diameter and weighing about 100 pounds have been made in this way. When larger sizes are demanded the six-inch ingots are joined mechanically and again melted to produce 12-inch diameter ingots about 36 inches long and weighing nearly 500 pounds. Larger sizes could be made by the same techniques if necessary.

Although the metal is very flammable as sponge, the melted material is stable and it can be forged or rolled at red heat without burning. Previously all forging and rolling was done by encasing the ingots in welded iron sheaths and then working at 850° C. Today fabrication is done in air at 700 or 750° C. At these temperatures the metal is somewhat stiffer and surface oxidation is a problem. However, oxide formation is confined to the worked surface, and the oxide can be removed by sand blasting and pickling in a 3.0 percent hydrofluoric acid bath containing lead nitrate.

AEC Contract

Until recently the U.S. Bureau of Mines was the only substantial producer in the United States. Last year a commercial producer contracted with the U.S. Atomic Energy Commission to produce 150,000 pounds per year.

Zirconium is about five-sixths as heavy as iron, and its tensile properties are similar to those of mild steel. It can be forged, rolled, spun and drawn and spot welded. It can be joined readily by heliarc welding and brazed with Easy-Flo solder and Special Handy Flux for titanium.

The machinability of zirconium is similar to that of stainless steel. Either carballoy or high-speed tools are satisfactory when used at slow speed and with a fairly heavy cut. The metal can be cut successfully with most metal saws or with abrasive cut-off wheels. Cutting should be done wet to eliminate a fire hazard, since the finely divided metal burns readily.

Top Corrosion Resistance

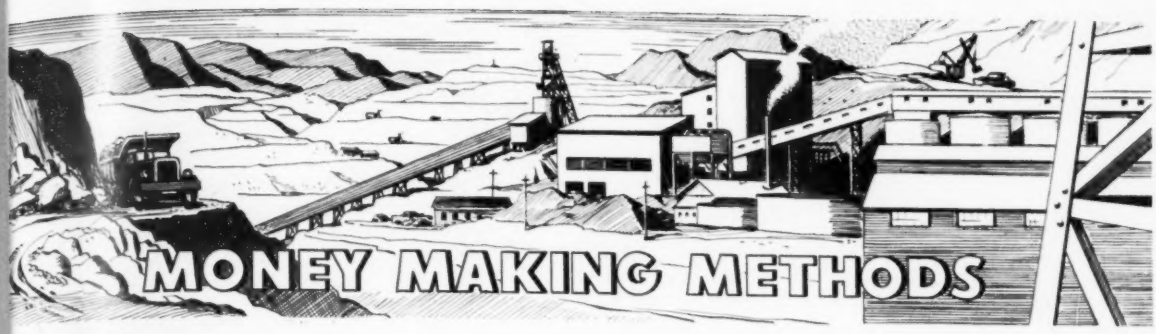
Probably the most significant property of the metal is its resistance to corrosion. It is insoluble in hot concentrated nitric acid, in 20 percent hydrochloric acid, and in boiling sulfuric acid in concentrations containing up to 80 percent. It is unattacked by organic acids and resists fused alkalis. In many instances it is superior to tantalum, particularly in its resistance to the alkalis. Indeed, only hydrofluoric acid attacks it readily in all concentrations.

Its corrosion resistance indicates that it will find use in many industrial chemical applications. One of its more interesting uses is for bone pins, screws, plates and suture wire for surgery. Tissue grows directly to it with no indication of deterioration or poisoning.

Key To Submarine Engine

Its excellent strength, coupled with corrosion resistance and extremely low neutron absorption characteristics indicate that the metal will be utilized as a structural material in atomic power reactors. Recently published articles point to the fact that zirconium may be an important material in the atomic submarine engine because it has a low neutron absorption capacity. Neutrons split uranium atoms and keep the atomic engine operating. Any absorption by the engine itself lowers the efficiency of the fission.

Zirconium, once a scientific novelty, suddenly has grown up. It is being produced in substantial tonnages, and its uses are widespread and vital.



HOW BUNKER HILL "STAIR STEP" BLOCK CAVES LOW-DIP LEAD-ZINC ORE BODY IN QUARTZITE

Block caving of 716,000 tons of low-grade lead-zinc ore with undercutting and drawing on a 35° to 60° footwall has been a success at the Bunker Hill mine of the Bunker Hill & Sullivan Mining and Concentrating Company. This is the report of C. E. Schwab, mining engineer in charge of the caving project, made at the annual convention of the AIME in Los Angeles, California.

Exploration in the upper levels of the mine proved an ore body 1,000 feet long and 165 feet wide. It is low grade, about 2.0 percent zinc, 1.0 percent lead, and 0.5 ounce silver per ton. The ore lies in the hanging wall of a major fault. One end is steep, dipping 65°. The ore body flattens to 45° near its middle, and the footwall converges to nearly conform with the fault. Small stringers of sphalerite, galena, and pyrite occur in massive quartzite which is strong enough to support untimbered mine workings. However, the stringers, bedding planes, jointing, and small faults all create zones of weakness which facilitate caving.

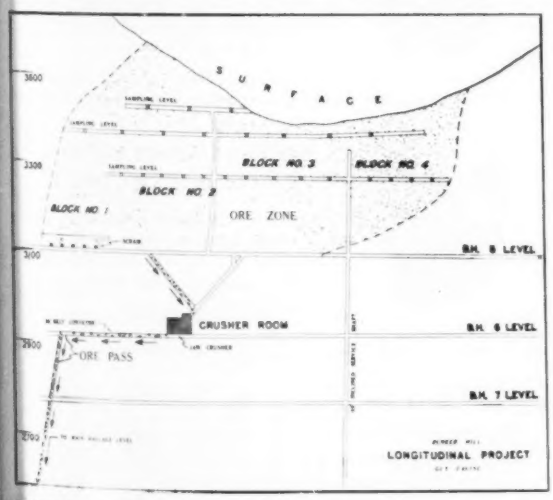
Bunker Hill management had extensive experience caving porphyry copper ore bodies but none in quartzite with a flat dipping footwall, so the steepest dipping portion of the ore body was designated Block 1 (see longitudinal section) and prepared first for caving. It was lowest grade and if caving were unsuccessful no valuable ore would be lost. Block-caved ore would be big so underground crushing was necessary before loading into regular mine cars for transportation through the two-mile-long adit to the mill. Accordingly, a 36- by 48-inch jaw crusher was placed underground so that the majority of caved ore could be gravity fed to it through a series of inclined ore passes. A 500-foot-long conveyor belt was also installed to carry the crushed ore, minus-5½-inches, to a main ore pass leading to the haulage adit 500 feet below.

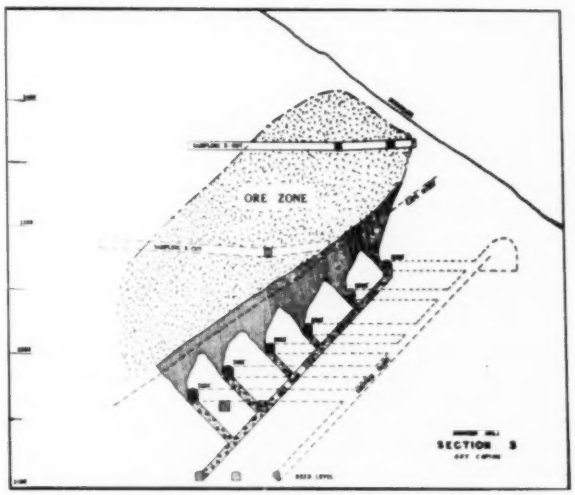
Four scram drifts, 50 feet apart, were next driven underneath the 200- by 200-foot block. They were placed at right angles to the strike with draw fingers at 25-foot intervals on a grid pattern. Flat undercutting was carried out under the block by crosscutting on the undercut level 25 feet above the scram drift. Pillars were blasted out on a diagonal retreat. No timbering was needed on the undercut level, but the scram drifts under Block 1 were lined with light rail. Fingers were timbered with about six rounds of 10-inch cribbing.

The scram drifts for Block 1 were equipped with 20-hp. electric hoists and 42-inch Eimco folding scrapers. The main transfer drift, 10 feet lower than the scrams, provided for direct ore transfer to the main ore pass. It was equipped with a 100-hp. electric hoist and two 60-inch scrapers in tandem.

Despite a three-month strike delay and low metal

LEFT: Longitudinal section, to scale, of Bunker Hill's block caving project showing relative position of the ore blocks, scram and transfer drifts, ore passes to crusher, belt conveyor and main ore pass. RIGHT: Cross section across the flatter portion of the ore body showing "stair step" arrangement of scram drifts and draw points in the footwall. Relation of service raise and access crosscuts to scrams is also shown.





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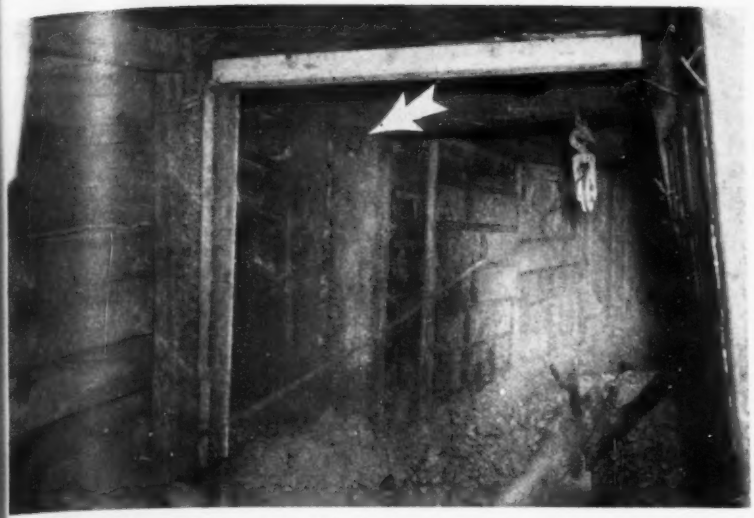

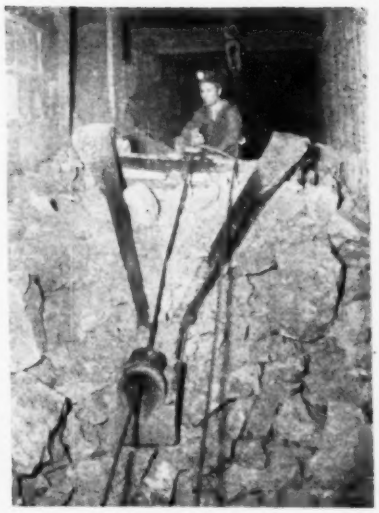

LEFT: A scram drift with finger at left. Note the tie rods from caps and posts on far side of finger. Detail of end block timber is also shown. RIGHT: Muck pile in scram from finger at left. The 60-inch wide scraper practically fills the scram for "pay load" slushing.

prices, successful drawing continued until March 1950 to provide needed operational answers for estimates. The answers were favorable: costs were in line and cavability and fragmentation successful. However, planning was continued for scrams and drawing of the ore body as the dip flattened to 65° and, subsequently, to 35° in other blocks.

A plan was evolved to cave the flatter portions of the ore body by undercutting and drawing through a series of scram drifts parallel and under the ore footwall. This created what might well be termed a "stair step" pattern of scrams up the footwall, and it had the obvious risk of the unknown effect subsidence might have. This system was designed to overcome the inherent disadvantages of flat undercutting of a dipping ore body which meant loss of ore along the footwall or undercutting and caving of footwall waste.

Details of this "stair step" caving of Block 2 are as follows: Undercutting is accomplished by shrinkage stoping on the ore footwall. After the scram has been completed, finger raises are driven, connected, and belled out. Access to the shrinkage stope is from small temporary raises driven from the stope bottom to hole through to the side of the scram above. As work progresses upward, these raises become part of the undercut. This method has been used successfully where the footwall dip is not less than 45°. Block 2, which is 200 feet long measured along the footwall, is served by an ore pass and service raise. Block 3 will be 300 feet long with the ore pass and service raise in the center.

Rail lining of scram drifts in Block 1 failed due to impact of the heavy scraper or large boulders dropping down the fingers. By a system of trial and experimentation, a system of timber lining has been developed and proven to be completely successful. Sets of 12- by 14-inch timber with 7-foot, 8-inch-long posts and 8-foot caps are usually placed on 6-foot centers. Between the sets, "end-grain" timber blocks are placed to form a solid wall. To afford protection for the posts, the blocks are about 2 inches longer than the posts are thick. The end grain blocks are held tightly within the set by threaded rods which bolt the caps and post of a finger set to the adjoining set (see photograph). The end grain fillers must be tightly placed and blocked solidly behind to be satisfactory. No maintenance of the sets is required as the relatively coarse ore is drawn; in fact, wear on the blocks has been negligible and it may be possible to salvage them for reuse after drawing in a block is complete. Blocks 18 to 24 inches long have also been used successfully for ore pass lining.

Draw control attempts to maintain the ore hanging wall and waste contact at about the same angle as it was originally. When fingers do not hang up to control draw rate, a few pieces of lagging will stop ore flow. Hang ups are blasted with dynamite tied to blasting slats. Secondary blasting has necessitated use of 0.08 pounds of dynamite per ton of ore. Smoke and dust are minimized on scram levels by forced ventilation through the service raises with exhaust air flowing through small escape raises at the end of each scram. High pressure water sprays are also used to minimize dust caused by scraping. Only one man works in each production scram and will average the drawing and transfer of 150 tons of ore per shift while doing all necessary blasting as well as minor repairing.

At the time Block 2 was 40 percent drawn, undercutting the adjacent end of Block 3 began and was put under slow initial draw. Undercutting rate of Block 3 will be at the rate needed to bring in new fingers as the ones at the extreme end of Block 2 are finished. This results in a slow retreat across the entire ore zone and attempts to establish and maintain a plane contact between broken ore and broken waste, which gradually moves along the strike of the ore at a constant angle. The draw, or subsidence angle, has been measured at 82° inclined into the block.

For the first 10 months of 1952, the total cost of all mining, transportation, and milling of caved ore was $3.97 per ton. It includes all chargeable expense, proportionate write-off of early deferred expenses, cost of draw preparation for future blocks, exploration for future ore reserves, costs, and all administration and service charges. Only cost exclusions are plant depreciation and corporate income taxes.

At reasonable lead-zinc prices, the operation has been a success. The basic plan appears well established and there seems little doubt that this operation has played some part in the evolution of a method of block caving peculiarly adapted to dipping ore bodies.

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2. Extra Large Idler and Sprocket eliminates rocking action, puts more track on the ground for greater stability and better traction.

3. Spring-Loaded, Positive Seal keeps dirt, moisture and grime from damaging truck wheels, idlers and support rollers . . . you lubricate them only once every 1,000 hours.

4. All-Steel, Welded A-Frame Track Stabilizer permits free track oscillation, yet keeps tracks rigidly in line and absorbs thrusts and twists from shock loads and working on uneven terrain.

5. Oil Enclosed Track Release Mechanism reduces track maintenance and breakage. An adjustable screw lock provides positive holding action that maintains adjustment at required setting.

6. Engine Not Used as Structural Member — no strain is transmitted to it. Engine weighs less per horsepower developed, because of 2-cycle design — has modern unit injection.

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With Allis-Chalmers *unit construction*, major assemblies are easily removed without disturbing related assemblies. This brings real savings in time and money, puts tractors back to work faster. It assures better inspection and maintenance, too. Servicemen find it easy to remove major parts to correct trouble before damage develops.

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Muriel Sibell Wolle Describes

GOLD CAMPS OF THE BACA GRANT

The hidden, deserted, overgrown, and razed sites of two mining camps —Duncan and Liberty—press close to the western base of the Sangre de Cristo range of mountains near the great sand dunes in the San Luis Valley of Colorado. Duncan lay within the "Baca Grant No. 4," an old Spanish land grant, while Liberty was built as close to the grant's southern edge as fencing permitted.

The history of the Baca Grant begins with Luis Maria Nuñez, a Spaniard who in 1823, in return for "services to the crown," was knighted, given a new name, Don Luis Maria Cabeza de Vaca, by King Ferdinand VII of Spain, and was presented with a huge tract of land in the new world covering the present site of Las Vegas, New Mexico. When Mexico succeeded Spain as ruler of the territory, a dispute arose about the title to the property held by Don Luis. As a means of settling the legal tangle, the Vaca family was offered rights to lands in other parts of the country. The descendants of Don Luis Maria were told to stake out four grants "at points of their own selection, thereby releasing the Las Vegas property. Certain of the sons of the Baca family, as it was now called, went north into the San Luis Valley in Colorado and located one of the grants in what is now Saguache County.

The crest of the Sangre de Cristo range became the eastern boundary of the grant, which comprised an area 12.5 miles square covering excellent grazing land, watered by six streams which had their source on the land. This 100,000-acre tract was then designated as Grant No. 4. At the close of the Mexican War, when the United States came into possession of Spanish and Mexican grants, this property, the largest in Colorado, was located by the Surveyor General of Colorado in the name of the heirs of Luis Maria Baca, by authority of an act of Congress, June 21, 1860.

Although the area was not selected for its mineral deposits, some prospecting had been done in the 17th century by the Spaniards because ruins of their crude arrastres and reduction works have been found at several points in the foothills. Rich float assaying "fabulously high in gold" was later found on Milwaukee Hill on Pole Creek and a rush to the diggings resulted. However, although a great deal of gophering was done and quantities of money expended, the source of the float was not located, and the gulch was deserted until the summer of 1892 when a new rush began.

The first big developments were made by the Sultan Mining & Milling Company which held 22 lode claims and 80 acres of placer ground on Pole Creek. Since the gulch down which the creek cascaded was steep, all work was done by tunnels. The Queen Esther Company built a mill to handle its ore, capable of treating 50 tons a day; a St. Louis company developed the Masked Venus on Alpine Creek, and others worked properties on Short Creek and on Sand Creek.

In 1898 legal troubles developed between the Land Grant company and the miners and to settle the argument the dispute was taken to court. The Supreme Court ruled that the Baca Land Grant was made on the supposition that it did not contain minerals; that although minerals had been found on it, three or four years after the location of the land, this was not sufficient ground upon which to cancel the patent, and therefore the court sustained the title to the land.

George H. Adams, the agent for the Grant, then announced that leases would be granted to prospectors and miners now occupying the ground on a royalty ranging from 1 to 10 percent; that the land would be laid out as favorably to the locators as possible; and that it had not been determined how long the leases would run nor what amount of work would be required. He added that it would take from 60 to 90 days to finish the vast amount of work required in considering and locating the applications for leases. During this waiting period, Adams sold a half-interest in the townsite of Crestone and the mineral part of the grant to "eastern parties" and assured them that there would be no business houses or mills on the grant, nor saloons in Crestone.

The *Saguache Crescent* of May 5, 1898, stated: "We do not see in this decision a blow at the mining industry of the east range. We are informed that the grant will be thrown open to prospectors and that

Liberty was laid out in 1900 at the base of the Sangre de Cristo range to replace Duncan, the mining camp on Baca Grant No. 4.

they will be given most liberal terms on a lease. Now that the uncertainty is over we expect to see renewed activities at Cottonwood, Duncan and Spanish Creek and believe that before another year rolls round, mills will be pounding away on the ores of the district and producing good revenues for the owners and operators alike."

In July, 1900, the San Luis Valley Land and Mining Company, which now owned the grant, sent a deputy United States marshall to serve a summons from the U. S. Circuit Court against a score of miners and settlers who, according to the company, were "withholding possession of the grant from the rightful occupants." The *Sagauche Crescent* of July 12th reported that if "trouble should break out it will be at Duncan. The grant is well patrolled. Practically all the squatters have been evicted. The few that remain will be ousted by the company which has taken over the mines and is ready to work them. There is a great feeling of resentment among the settlers . . . but the company is able to hold its own." General distrust and excitement existed but since the "blowing up of the cabins on Dead Man's Creek on June 26th there has been no overt act of violence. The armed men of the company have been instructed to keep the peace. . . . The company is willing to put friendly miners to work and four at Duncan have accepted."

Old timers living in Crestone remember the clash between the miners and the Land Grant company. They tell how thugs were hired to run the people out and of how the miners had to clear out or sell out. When the town folded, the houses were moved outside the grant fence, some to the new camp which sprang up just south of Duncan and others to outlying valley communities.

No sooner were the disgruntled miners off the grant than they camped just outside the fence and continued prospecting the gulches to the south, especially Short Creek. Some mining had been done along this creek in the 1880's but from 1900 on the area was developed. The men defiantly called their new camp Liberty, and although it adjoined the grant it was on ground to which they had clear title.

Liberty camp was in the Music mining district near Music Pass. This pass crossed the range close to the great sand dunes whose shifting surface, blown by the wind, produced the "singing" sounds—hence its name.

In 1941 I visited both camps. Duncan was merely a site with one cabin, and Liberty consisted of scattered cabins in a tangle of underbrush. The log schoolhouse, built by donations from the townspeople, was gone, for it is nearly 50 years since the last teacher taught the three remaining pupils in the camp—all members of one family. A false front building was labeled "Postoffice" and near it stood two or three frame shacks. A bunkhouse, a blacksmith shop, and a water wheel beside the creek were all shaded by big trees. The narrow foot trail up the creek was so overgrown that I had to push aside bushes that blocked the path. Abandoned objects half-hidden in the tangled vines lay on the ground—a saddle with its leather rotted away, a wagon nearly enveloped in underbrush, fence posts marking the site of a home and its garden. A few houses still lined the creek, their doors and windows gone and their roofs sagging. On the porch of one was a wicker rocker and inside another was an iron bedstead. When mining ceased, Liberty's buildings like those at Duncan were moved away; mostly to Crestone where they are still in use. Both camps are utterly deserted and soon only old timers will be able to point out where they stood.

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ACTIVITIES OF U. S. MINING MEN

WALTER A. STERLING (right) has been elected president and a director of The Cleveland-Cliffs Iron Company. Mr. Sterling started with the company as a mining engineer at Hibbing, Minnesota in 1919. **ALEXANDER C. BROWN** will continue as chairman of the board of directors and executive officer.

S. K. Droubay has been appointed general manager of the newly organized United Park City Mines Company in Park City, Utah. Mr. Droubay was former manager of Anaconda Copper Mining Company's properties at Darwin and Shoshone, Inyo County, California. The new company was formed by a merger of Park Utah Consolidated Mining Company and Silver King Coalition Mines Company.

Edmund Mansure is new administrator of the Defense Materials Procurement Agency, succeeding **Howard I. Young**. Mr. Mansure is former administrator of General Services Administration.

Otto Duke, former assistant chief engineer in charge of Combined Metal Reduction Company's Bauer, Utah operations, has joined the staff of Sterns-Roger Company of Denver, Colorado. He will supervise the design of a new copper smelter for San Manuel Copper Company near Tucson, Arizona.

Max D. Howell is new executive vice president of the American Iron and Steel Institute. **Benjamin F. Fairless**, United States Steel Corporation, and **Ben Moreell**, Jones and Laughlin Steel Corporation, were elected vice presidents; **George S. Rose**, secretary; **E. O. Sommer, Jr.**, treasurer; and **C. M. Parker**, assistant vice president.

F. McIntosh Galbraith, former chief geologist of Day Mines, Inc. in Wallace, Idaho, will organize and head a geological department for Columbia Iron Mining Company in Cedar City, Utah. Columbia is a subsidiary of United States Steel Corporation.

Thomas W. Mitcham is a new addition to the exploration staff of the Grand Junction operations office, U. S. Atomic Energy Commission. Mr. Mitcham formerly was a geologist and staff engineer with American Smelting & Refining Company at Tucson, Arizona.

John C. Mitchell has accepted a position as manager of uranium-vanadium mines for the Climax Uranium Company with headquarters in Grand Junction, Colorado. He resigned as American Smelting and Refining Company's Leadville, Colorado district mine superintendent to accept the new position. He previously had been employed by ASARCO at its Kokomo, Colorado lead-zinc mine operations, and at the firm's exploration project at the Genessee Tunnel at Red Mountain, Ouray County, Colorado. He is a graduate of the Colorado School of Mines.

Richard F. Newlin, vice president of mining operations for Anaconda Copper Mining Company, recently made a ten-day inspection of company holdings in Montana. He was accompanied by **Chester Steele**, vice president in charge of western operations, and **A. C. Bigley**, general manager of western mining operations. The trio also inspected company mines and plants in California, Nevada, Utah, and Idaho.

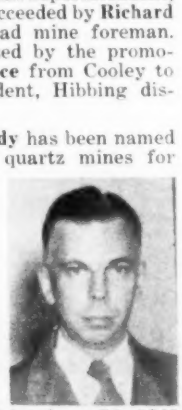
Gordon McCulloch has resigned as power superintendent for Northwest Magnesite Company at Chewelah, Washington to accept a position as electrical, mechanical, and maintenance superintendent as Howe Sound Mining Company's Chelan division in Holden, Washington.

Edwin H. Oshier has resigned as superintendent of New Penn Mines, Inc. at Campo Seco, California to head the department of mining engineering at the South Dakota School of Mines, Rapid City, South Dakota. Before his employment at New Penn, he was superintendent of the open pit gold-gravel mine and "dredge like mill" of Round Mountain Gold Dredging Company at Round Mountain, Nevada. He had also been an engineer for Golden Queen Mining Company at Mojave, California.

Dr. Carl J. Christensen, dean of the College of Mines and Mineral Industries at the University of Utah, has resigned to enter private industry. He has been at the University since 1946, when the mines college was formed.

R. C. (Bob) Crist has been appointed superintendent of Cooley district operations of the M. A. Hanna Company. **Fred Dyson** moves into Mr. Crist's former job of assistant superintendent, and he, in turn, is succeeded by **Richard Whitney, Jr.** as head mine foreman. The shift was caused by the promotion of **R. C. Wallace** from Cooley to general superintendent, Hibbing district.

Richard T. Mecredy has been named state inspector of quartz mines for Montana. Mr. Mecredy, a miner for 28 years, succeeds **Tom Haney** who has resigned.



EUGENE P. REED is new assistant manager of raw materials at United States Steel Corporation's Tennessee Coal and Iron Division. Mr. Reed formerly was assistant to the manager of raw materials, and has been affiliated with TCI's mining operations since joining the staff in 1948 as special engineer at the Ore Mines and Quarries Division. He was superintendent of the Muscoda division of TCI before becoming assistant to R. E. KIRK, manager of raw materials.

RICHARD V. COLLIGAN, mining geologist, has been appointed Cuban representative for Freeport Sulphur Co. and its subsidiary, Nicaro Nickel Co. He will direct development work at Moa Bay, Oriente Province where Nicaro recently discovered an important proven source of nickel. He will also oversee the company's other mineral exploration activities on the island. Mr. Colligan has spent eight of his 13 years with the company in Cuba, and from 1943 to 1947 was assistant mine superintendent and then railroad and mine superintendent at the Nicaro nickel mines.

U. S. mining men attending the Fifth Mining and Metallurgical Congress in Australia included **Richard J. Anderson**, assistant to the director of Battelle Memorial Institute in Columbus, Ohio; **W. Blum** of Maryland; **C. T. Hill**, vice president of Texas Gulf Sulphur Company; **Dan M. Kentro**, manager of American Cyanamid Company's uranium metallurgical laboratories; **T. W. Oster**, U. S. Atomic Energy Commission, Grand Junction, Colorado office; and **M. L. Reyner**, U. S. Atomic Energy Commission, Salt Lake City, Utah office.

A. E. Haesler, former general superintendent of the Mike Horse Mining and Milling Company, Mike Horse, Montana, is now superintendent of the Leadville, Colorado district mining operations for the American Smelting and Refining Company. Mike Horse is an ASARCO subsidiary.

Thomas Hedlund is now working for the Newmont Exploration Company with headquarters at Tombstone, Arizona. He is a graduate of the Colorado School of Mines and previously worked as engineer for Telluride Mines, Inc. at Telluride, Colorado. He left his recent job as engineer and shift boss for King Lease, Inc. at the Camp Bird mine, Ouray County, Colorado to accept Newmont employment.

L. F. Paddison, mining and geological engineer with the United States Smelting Refining and Mining Company, retired March 31. He entered the firm's employ in 1914 and remained with them continuously except for 1922 and 1923 when he was chief engineer for the Magna Copper Company. Mr. Paddison was active in exploration and operating work in the United States, Canada, and Mexico. During the last 15 years, he was retained as a mining and geological engineer in the Boston, Massachusetts office of the company. He now plans to engage in a limited amount of consulting work, and will continue to reside in Auburndale, Massachusetts.

Joe Robison has joined the engineering staff of the White Pine Copper Company at White Pine, Michigan. He had formerly been with the Shenandoah-Dives Mining Company at Silverton, Colorado.

Rip V. Thompson has retired from Manganese Inc., a Henderson, Nevada firm, because of poor health and is presently recuperating at 2292 Orchard Lane, Merced, California.

J. Carlos Palombo and **Itzhak Hoffman**, foreign exchange students from Argentina and Israel, respectively, are receiving on-the-job training at Inspiration Consolidated Copper Company, Inspiration, Arizona. Both studied at Montana School of Mines and, after familiarizing themselves with Inspiration's "leaching" methods, will attend Columbia University.

Elihu Clagg and **Hugh Price** are new directors of the Whitedelf Mining and Development Company of Clark Fork, Idaho.

David A. Bruneau, purchasing agent for Pickands-Mather Company, has been transferred from the Duluth office to Cleveland, where he will take charge of the complete purchasing program for the new Erie taconite plant.

E. I. Beutner, former resident geologist for the Michigan Ore Division of Jones & Laughlin Steel Corporation, Ishpeming, Michigan, has been promoted to chief geologist of the corporation and will be stationed in Pittsburgh, Pennsylvania. His successor as resident geologist will be G. A. **Hoffman**, former mine geologist at J&L's Tracy mine.

George E. Stone has been appointed chief engineer for Basic Refractories, Inc. in Cleveland, Ohio. Mr. Stone has been with the company since May 1921, and succeeds the late W. W. **Patnoe.**

Horace Y. Bassett has been named vice president of operations of Calumet & Hecla, Inc. The former vice president and general manager of the company's Wolverine Tube Division will make headquarters in the new C&H executive offices at the People's Gas Building, 122 S. Michigan Avenue, Chicago, Illinois.

Marvin A. Hustad, recent graduate of the Wisconsin Institute of Technology, is now employed at the Lincoln Mine of the Black Rock Mining Corporation at Tempiute, Nevada.

Harry Cole has been appointed general superintendent of the Rail Transportation Department of United States Steel Corporation's Tennessee Coal and Iron Division, succeeding the late **Clyde H. Brown. Franklin S. Trantham** has been promoted to Mr. Cole's former job of assistant general superintendent.

Dr. Albert J. Phillips has been elected vice president of American Smelting & Refining Company. He has been with the company since 1931, and has been director of research since May 1949.

Darwin J. Pope, general manager of American Smelting & Refining Company's western mining department, has transferred to New York, where he will be assistant to the vice president in charge of mining. **F. V. Richards**, manager of operations, will succeed Mr. Pope.

OBITUARIES

Joseph B. Petty, 39, director of labor relations at the Fontana works of the Kaiser Steel Corporation, died in a plan crash in the San Francisco Bay April 20. He had been connected with the steel industry since 1930, when he began work for Youngstown Sheet and Tube Company in Youngstown, Ohio.

Clarence E. Abbott, vice president of the Tennessee Coal, Iron and Railroad Company, a U. S. Steel Corporation subsidiary, died after an illness April 14 in Raleigh, North Carolina. Mr. Abbott had been vice president in charge of mining operations for TCI from 1930 to 1942.

Kenneth Mansfield Niall, 69, died on April 11 in Melbourne, Australia. He was chairman of Mt. Lyell Mining and Railway Company, Mort Limited and Euston Lead (Aust.) Limited.

Paul P. Whitehead, 68, geologist for the Ray Mines Division, Kennecott Copper Corporation, died April 9 at work of a heart attack. Mr. Whitehead had been a member of the Ray mine staff since 1912.

Earl Schulz died recently in a highway accident near his home in McGill, Nevada. Mr. Schulz, an employee of Kennecott Copper Corporation, had recently returned from Murgul, Turkey where he had acted as a mining consultant.

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ACTIVITIES OF INTERNATIONAL MINING MEN

MARCUS D. BANGHART has been advanced from general manager to managing director of Tsumeb Corporation Ltd. and O'okiep Copper Company, Ltd. in South West Africa. Mr. Banghart recently made an off-the-record speech on Tsumeb operations in New York before members of the Mining and Metallurgical Society of America.

G. V. Standerline, manager, Stanton Mining Company, Scunthorpe, England, has resigned to accept a position as mechanization engineer with the National Coal Board in London. He is the author of the article "How English Iron Mine Expands Output," which appeared in the February 1953 edition of Mining World.

Guy N. Bjorge, retired general manager of Homestake Mining Company, is on an extensive tour of Europe. He will spend several weeks visiting mines in Sweden and Norway before returning to San Francisco, California, where he will live.

Sven Hjerdin, chief engineer for the State Commercial and Industrial Commission in Stockholm, Sweden, has been sent to the Philippines to assist the government in iron and steel questions.

Luang Rot Ratavicharn is new director of the government-owned Mines Organization, which controls all mines in northern and central Thailand.

Recent additions to the engineering staff of Utah Construction Company in Korea are **Harold Rouse, M. J. DeBattista**, and **Robert Mitcham.** Utah Construction has a management contract with the Korean government to rehabilitate its tungsten mine and mills, and increase output. Another group of experts were previously sent there to make an on-the-job survey.

Dr. N. H. van Doorninck has left Johannesburg, South Africa to return to The Hague, Netherlands. He may be reached at Twentsche Bank, The Hague.

Dan M. Kentro, manager of the uranium metallurgical laboratories operated by the American Cyanamid Company at Winchester, Massachusetts, recently attended a conference in Australia with the Australian Energy Board and **Premier Playford** of South Australia. Mr. Kentro attended as a representative of the U. S. Atomic Energy Commission. Principal discussion topics were the new uranium mill at Radium Hill, South Australia and the new concentrating plant to be built at Rum Jungle, Northern Territory. Size of the latter plant has not been announced, but it will be built and in full operation within a year.

The inaugural meeting of the Victorian division of the newly formed Geological Society of Australia was held recently in Melbourne, Victoria. Chairman and Acting Secretary is **Professor E. Sherbon Hills**, University of Melbourne.

Jan H. Marsman, president of Marsman & Company, was elected president of the recently organized Chamber of Mines of the Philippines. Other officers elected are **B. G. Brandt** of Luzon Stevedoring, first vice president; **P. M. Jordan** of Mindanao Mother Lode, Inc., second vice president; and **Nestorio M. Lim**, secretary-treasurer.

Ahmet Sumer is now in charge of a manganese mine for Duspelit Manganez Isletmesi in Zonguldak, Turkey.

Jack Pearson, previously employed by the American Smelting and Refining Company in Mexico, is now mine foreman at the Antamok, Benguet mine of the Benguet Consolidated Mining Company, Philippine Islands. **William Gosler** of Australia is a new mill foreman for Benguet, and **Virgil E. Frank**, recently returned from Brazil, has been appointed general superintendent of the Benguet-operated Consolidated Mines Chromite Mine at Masinloc, Zambales.

J. W. Westaway has been appointed acting superintendent of mills at Mount Morgan Mines Limited in Australia.

Stephane Verter, formerly affiliated with Mines de Kassandra at Stratoni, Chalkidiki, Greece, has now set up his own consulting mining engineer's offices at 19 rue du Mazel, Lodeve, Herault, France.

DR. D. N. WADIA (left), geological advisor to the Indian government, and E. P. UTTING, geologist for Broken Hill Proprietary Company, are shown inspecting Broken Hill's Monarch Quarry at the Whyalla, South Australia works. The iron ore quarry accounts for the bulk of the company production, which is some 2,650,000 tons per year. Dr. Wadia was in Australia attending the Fifth Empire Mining and Metallurgical Congress. Mr. Utting will soon accompany F. CANAVAN, Broken Hill's chief geologist, on a tour of iron ore workings in the United States, Canada, and possibly Venezuela, Sweden, and England.

S. B. DICKINSON, South Australian Director of mines, has been the driving force in obtaining capital backing and stimulating interest in Australia's Radium Hill uranium project. Mr. Dickinson recently traveled to the United States with Mr. Playford, South Australian premier, to obtain financial assistance and since then has directed the project's development.

E. G. Lube is new chief surveyor at Mount Lyell Mining Company, Queenstown, Tasmania, Australia.

Willis Dunne, mine superintendent of Baguio Gold Mining Company near Baguio, Mountain Province, Philippine Islands, has resigned and is now taking a six-month tour around the world.

P. W. J. van Rensburg has moved to Venterspost Gold Mining Company, Ltd. at Westonavia, Transvall, South Africa, where he is now underground manager. He previously held the same position with Robinson Deep Mines, Ltd. in Johannesburg.

Ramon W. House has left Cedar City, Utah to accept a position with Cerro de Pasco Corporation at its Mina Cuajone in Cuajone, Moquegua, Peru.

Alexander K. Anderson has retired after serving for 28 years with the staff of the Mines Branch, Canadian Department of Mines and Technical Surveys. Mr. Anderson is an expert in mineral dressing and has spent the past few years redesigning the Mines Branch's non-metallic mill to obtain more efficient operation.

Amado Arrieta is in charge of development work now underway at the Toledo Mine of Masbate Consolidated in Cebu, Philippine Islands.

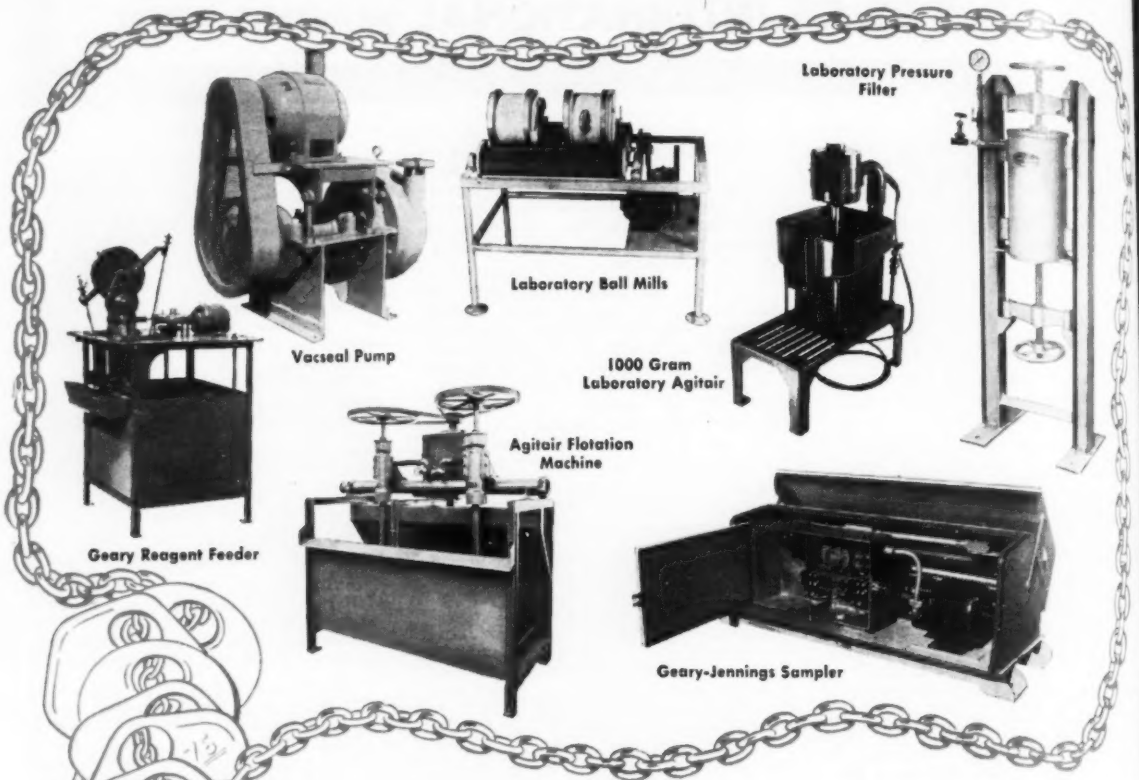
H. R. Mitchell has joined the boards of directors of United Tin Areas of Nigeria and Ribon Valley (Nigeria) Tinfields. Mr. Mitchell recently resigned from his position as Chief Inspector of Mines for Northern Nigeria.

M. C. Halsted is new general manager of Jardun Mines of Canada. Among the areas he will direct is the company's property near Sault Ste. Marie, northwestern Ontario, where resumption of operations is planned.

V. Gorsky has established his Consulting Engineer & Metallurgist offices in Natal, South Africa, after completing consulting work with the Titanium Corporation.

John M. Russell has been apponted superintendent of the Kirwa Wolfram Mines, Ltd. in Uganda, Africa.

7 keys to sound metallurgy



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INTERNATIONAL NEWS

Three Philippine Gold Mining Firms Merge

Three pre-war gold mining companies, no longer able to operate under present adverse conditions, have pooled their resources in the Philippine Islands to develop copper and iron deposits.

The Masbate Consolidate Mining Company, Antamok Goldfields Mining Company, and IXL Mining Company are consolidating into the Atlas Mining and Development Company with a capitalization of Pesos 15,000,000 ($7,500,000) and Col. Andres Soriano as president. Japanese firms will buy the iron ore and copper concentrates, agreeing to furnish capital to start production. Two ore deposits will be developed and mined, while exploration is undertaken on other prospects.

The Toledo copper deposit on Cebu Island has already been proved in superficial workings to have 400,000 tons of 2.0 percent copper ore. Lower tunnels will be driven and the ore proved at depth by diamond drilling.

From the Mati iron deposit in Davao on Mindanao Island, the Atlas company expects to ship 720,000 tons of iron ore annually to Japan at an average price of $8.50 per ton for 60 percent ore. An advance payment of Pesos 3,000,000 ($1,500,000) will be made to help in developing the property.

Inco and DMPA Sign Nickel-Copper Contract

The International Nickel Company of Canada, Ltd. has signed a contract with the Defense Materials Procurement Agency which will provide the United States with a total of 120,000,000 pounds of metallic nickel and 100,000,000 pounds of electrolytic copper. Deliveries, at the rate of 2,000,000 pounds per month of metallic nickel and 1,666,666 pounds per month of electrolytic copper, will begin in December and are scheduled to be completed in 1958.

The contract is made possible by the new project in the Sudbury district of Ontario which permits additional production of 2,000,000 pounds monthly over Inco's current peak capacity. Operation of the project involves mining and treating of 10,000,000 tons of underground material which are not commerical under present conditions. It will also require substantial capital expenditures by the company for underground and surface equipment.

Kennecott Back In Alaska For Orange Hill Exploration

Kennecott Copper Corporation is returning to Alaska this summer to conduct an exploration program about 50 miles from the famous Kennecott mine where it got its start. Operating through its exploration subsidiary, Bear Creek Mining Company, Kennecott has moved a four-man exploration crew into the upper Nabesna River area to conduct geological reconnaissance of the well known Orange Hill deposit.

Lowell B. Moon, northwest district geologist for Bear Creek mining, organized the field work which is field-directed by Glenn C. Reed. Key exploration equipment will be a magnetometer which will be used to trace contact zones by means of the associated magnetite. The field party was flown in by airplane and supplied by air at a newly built Kennecott air strip on the east side of the Nabesna River near Orange Hill.

An unpublished United States Geological report indicates inferred deposits of some 200,000,000 tons of material assaying 0.4 percent copper, 0.02 percent molybdenum, 0.02 ounce gold, and 0.8 ounce silver per ton. Kennecott hopes to extend the known reserves of this material or to locate higher grade sections with its exploration work.

Dr. James Boyd, with headquarters in New York, New York, is in charge of Kennecott's world-wide exploration activities.

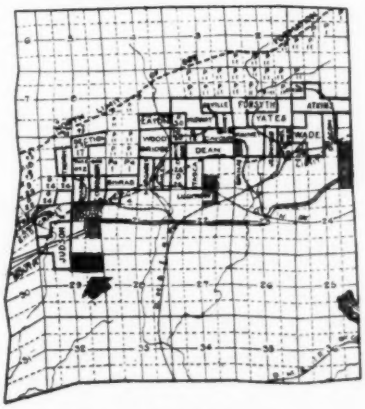
Sylvia-Dee Co. Formed To Mine on Mesabi Range

A new firm, the Sylvia-Dee Mining Company, has been formed on the Mesabi Range to mine iron ore from the Michael mine near Buhl, Minnesota. Stripping operations have started, and the M. A. Hanna Company reportedly has already contracted for the ore production which is expected to amount to 125,000 tons during this shipping season.

The new mine is located to the east of the Judson mine operated by the W. S. Moore Company on a state lease. During 1951, W. S. Moore mined 100,507 tons of iron ore from the Judson, and in 1952 the firm mined 153,842 tons.

Eqiupment has been ordered for the new project, including a Lorain two-yard shovel and a fleet of 22-ton Euclid trucks. Plans call for building a crushing and screening plant this year.

Place-fix map of the new Michael mine of the Sylvia-Dee Mining Company.



President of the company is David D. Haley, secretary-treasurer of the Haley-Young Mining Company. Oscar Nelson is vice president and director of operations; Joseph Lovallo, executive secretary; and B. C. Timmerman, treasurer. Directors are Helmer A. Frankson and John Langhausen.

Mexican Producers Sign More Manganese Contracts

Seven additional manganese purchase contracts have been signed by producers in the United States and Mexico, bringing to 12 the total number of such agreements negotiated by the Defense Materials Procurement Administration. (See MINING WORLD, July 1953, p. 63.)

The new contracts call for delivery of 136,000 tons of ore, while the previous ones covered the sale of 280,500 tons. The total program, instituted by the DMPA to develop domestic and nearby sources of manganese as insurance against loss of overseas supplies, encompasses production of 550,000 tons. The remaining 133,500 tons are under negotiation.

Deposits in five Mexican states—Chihuahua, Durango, Zacatecas, San Luis Potosi, and Jalisco—will be mined by the following companies: Minas Consolidadas, S. A., El Paso, Texas; Fierro Y Manganese, Torreon, Coahuila, Mexico; Ore & Ferro Corporation and Continental Ore Corporation, both of New York, New York; Minero Fernandez and Yacomo, Inc., both of Chihuahua, Mexico; and Explotadora de Minerales, Mexico City, Mexico. The ore will be shipped to a receiving depot at El Paso, Texas.

Rio Tinto Moves Into Canadian Mining Field

Rio Tinto Co., Ltd. has formed a subsidiary company, Ownamin Ltd., with offices in Toronto, Canada to find properties warranting more intensive exploration.

Ownamin's first work, already under way, is on the Holland Township block of 101 claims in the Gaspe, Quebec, copper area, owned by Area Mines Ltd. Ownamin will spend $150,000 on exploration by the fall of 1955. Two-thirds of this will be for geophysical surveying, and the balance is for preliminary diamond drilling.

The two firms have agreed that if further work is desirable, a new 3,000,000-share company will be formed with each firm receiving 500,000 shares. Option on the remaining 2,000,000 shares would be granted as follows: Area 20 percent; Ownamin 80 percent.

Personnel in the Ownamin organization include E. B. Gillanders, manager; Oscar Weiss, managing director; N. R. Schindler, chief geologist; Charles Pegg and E. N. Smith, geologists. Mr. Smith will be in charge of the Gaspe work, while Mr. Pegg will do some preliminary scouting in British Columbia.

Vulcaan of Holland Deals For Canadian Iron Ore

If negotiations now underway between Fenimore Iron Mines Ltd. of Quebec and N. V. Handels-En Transport-Maatschappij (Vulcaan) prove successful, the large Dutch company will make its first entry into North American mining and the European market will be opened for Canadian iron ore. The two firms are discussing a three-way plan in which West German steel interests and Vulcaan will develop Fenimore's 228-square-mile iron ore (siderite) concession in the Ungava Bay area.

Dr. Joseph A. Retty, Fenimore president, estimates that the deposits contain at least 566,000,000 tons of commercial ore, and that development would cost about $68,000,000. He also said that concentrates could be produced at a cost of about $7 per ton, with delivery f.o.b. Baltimore increasing costs $3 or $4.

The ore bodies are located near tidewaters south of the opening of the Hudson Bay into the Atlantic. Since any port in the area will be ice-locked eight months out of twelve, mined ore may be stored in more accessible areas to facilitate shipments on a year-round basis to the steel concerns.

Vulcaan would be sole selling agent for concentrates in the European area, with the German works supplying machinery and installations in exchange for ore. Fenimore would be free to act in Canada, the United States, the United Kingdom, or any other country without the European continent.

Burma Mines Increases Ore Production at Bawdin Mine

Burma Mines Limited, operator of the famous Bawdin silver-lead-zinc mine in the Shan States of northern Burma as a joint venture by the Burma Corporation, Ltd. and the Government of the Union of Burma, is continuing mine rehabilitation and increasing the underground working force.

Comparative figures for production for the third and fourth quarters of 1952 are, respectively: ore mined 2,088 long tons, 7,847; ore milled 1,360, 12,273; head assay 13.2 ounces silver, 15.3 percent lead, 11.4 percent zinc per ton, compared with 13.94 ounces silver, 15.37 percent lead, 12.56 percent zinc; lead concentrate 713.93 tons assaying 52.26 ounces silver, 51.8 percent lead, 14.28 percent zinc per ton, final quarter not available; zinc concentrate 410.27 tons assaying 8.70 ounces silver, 3.60 percent lead, 57.4 percent zinc per ton, 1,820.4 assaying 57 percent zinc. In the fourth quarter 709.5 tons of lead bullion, 121,931.8 ounces of refined and Dore silver, 65.5 tons of copper matte, and 90 tons of nickel speiss were produced.

The labor force increased to 2,321 during the third quarter (surface 337, underground 735, Namtu 1,449). The underground force increased to 861 by the end of October, and to 1,040 by year end.

The concentrator plant, idle since 1949, was put into service in mid-July to treat over 5,000 tons of crude ore, mainly from old surface stocks. Ore extracted from the mine rose slowly from 417 tons in July to 986 tons in September, to 2,030 tons in October, and a gradual increase to 4,000 tons per month in December. Good progress was made in rehabilitation and repair of underground workings at the mine and essential housing accommodation for personnel in preparation for the target of 8,000 tons of ore per month, the accomplishment of which is now primarily dependent on the recruitment and training of mine labor and staff.

Additional stopes are now ready for production but cannot be manned until experienced miners become available.

Labor engaged in the pre-war mines was mainly Chinese and Indian. With the closing down of mining in 1941 due to the Japanese occupation, labor migrated from the mining areas. Post-war, because of the Burmanising policy adopted by the government, many mining areas have found difficulty in recruiting the indigenous agricultural workers for mining even though the remuneration offered is much higher. Recruitment of 150 Gurkha ex-miners from India continues.

Ore reserves, last calculated before World War II, were estimated at 3,130,199 tons assaying 15.1 ounces silver, 19.5 percent lead, and 12.1 percent zinc per ton.

Britain To Aid Industry In Potash Development

The British government will assist private industry in the development of potash-bearing deposits discovered in northeast Yorkshire in 1950. The field extends for at least 12 miles, and boreholes have indicated that it contains at least 200,000,000 tons of potash, 35 percent of which is enough to meet consumption in the United Kingdom for 150 years.

Sir Arthur Salter, Minister of Materials, met with representatives of Imperial Chemical Industries (ICI) and Fisons to discuss the companies' report on the possibilities of commercial exploration. The two firms have already spent considerable sums on this—Fisons has drilled four boreholes and ICI has seven boreholes in operation. It is estimated that about £2,500,000 would be needed to bring the field into commercial production.

The deposit lies 4,000 feet below the surface, 500 feet lower than the German deposits at Hanover which are the deepest in the world mined commercially. This factor makes mining difficult. Coal is mined at this depth in Britain with manual labor which considerably increases the cost of the operation. Powell Duffryn Technical Services is investigating this aspect on behalf of Fisons.

ICI is considering the brine method by which the deposit is dissolved and the solution pumped to the surface through pipes. One disadvantage of this technique is that other minerals are also dissolved by the brine and would have to be separated from the potash at the surface. One of the ICI boreholes has been converted into an experimental brinewell but there is not enough data to evaluate the method yet.

Russ Mineral Output Concern of New Minister

Evidence is increasing that the U. S. S. R. is diverting its mineral resources to the armament program at the cost of a stable industrial expansion, and a step-up in the mining program may be the result of a recent Malenkov appointment.

M. Z. Saburov, one of two economic experts in the Politburo and former chief of the economic planning commission, has been made head of a new ministry of Machinery Production. Four former departments or ministries—agricultural machinery, automobiles and tractors, machine tools, and instruments—are involved in the consolidation.

Apparently the mining industry has not been able to furnish both arms and machinery manufacturers with needed metals, and the machinery makers have suffered. Production of farm implements, in particular, has fallen off. Mr. Saburov has reportedly expressed concern about the development of mineral resources, emphasizing the decline in exploration activity and the difficulty posed by low-grade ores. This latter statement would indicate that newly located deposits either contain much low-grade ore, or that refining facilities and techniques are inadequate.

Alcoa and Kaiser Make Major Aluminum Purchases

The Aluminum Company of America and Kaiser Aluminum & Chemical Sales, Inc. have signed a contract with Aluminum Limited, parent company of Aluminum Company of Canada, Ltd., for the purchase of 786,000 tons of primary aluminum. Alcoa will buy 600,000 tons and Kaiser 186,000 during the years 1953-58, with 75 percent of the total to be delivered from 1955-58.

The additional production will be furnished by a downward revision of commitments made to the United Kingdom which would release 176,000 tons, and from additional production at Aluminum Company of Canada's Kitimat, British Columbia, project which should be in operation within one year. Decision has been postponed for the present on construction of additional smelting facilities to accommodate the expansion.

Northern Rhodesia Gets $14,000,000 Rail Loan

Northern Rhodesia has been granted a loan of $14,000,000 by the International Bank for Reconstruction and Finance to carry out a three-year development of its railways. The money will be used to add new equipment to the overburdened existing facilities and to build a new connection between the inland and the sea.

An example of the proportions which the rail shortage has reached may be seen in stockpiles of chrome ore along the tracks which total over 500,000 tons. Tonnage carried last year was 70 percent greater than 1946 shipments.

Northern Rhodesia produces about one-eighth of the free world's supply of copper, and one-fifth of its cobalt.

Tsumeb Corp. Completes New Ore Loading Dock

The Tsumeb Corporation Limited has completed its new 300 ton per hour shiploading dock at Walvis Bay, South West Africa. The new dock, and concentrate and ore storage facilities were built at a cost of $960,000 to speed shipments of copper-lead, and zinc concentrate and manganese ore. With the new facility it is now possible to completely load a 16,000 ton ship in slightly over two days. Storage space is provided for 15,000 tons of copper and lead concentrate in a 563 foot long bin, for 5,000 tons of zinc concentrate in a 221 foot long bin, and for 5,000 tons of manganese ore in a 207 foot long bin. Concentrates arrive by rail in side dumping cars which discharge directly into the bins. A bulldozer then distributes them to a depth of eight feet. For ship loading a three stage belt conveying system is used.

Kennecott To Develop New Copper Mine in Nevada

Kennecott Copper Corporation will develop a new open-pit copper mine in Nevada. Work will start in the near future and full production is expected to be attained in 1954.

The new open-pit operation will be a development of an ore body, known as the Veteran, which is located near Kennecott's present Nevada operations. The ore body is 1400 feet long and 600 feet wide and consists of low-grade copper ore, averaging less than one percent. Although this deposit was mined by underground methods many years ago, it has not been in operation since 1914.

This is the second major development undertaken recently by Kennecott in this area to add to the country's production of the vital red metal. The first undertaking involved the moving of an entire town in order to operate new shafts of the so-called Deep Ruth mine, which will be in full operation in 1954.

Second South African Uranium Plant Opened

A second South African uranium extraction plant has been opened at Daggafontein Mines, Ltd. which has four times the capacity of the recently opened plant of West Rand Consolidated Mines, Ltd. Both companies have incorporated facilities for sulphuric acid and uranium byproduct production in adjacent areas.

The new plant, however, has a double byproduct feature. The ore is first crushed, pyrite floated, and flotation tailing separated into sand and slime portions from which the largest part of the gold is recovered by cyanidation. The slime cyanide tailing is then treated to recover uranium. The pyrite concentrate is roasted and SO_2 gas used for sulphuric acid manufacture. In this plant the roaster calcine contains small but significant amounts of gold which can be recovered by recirculating the calcine to the grinding circuit. Thus, uranium and pyrite are gold byproducts and the pyritic gold is a byproduct of a byproduct.

Anglo American Corporation of South Africa, Ltd., which has an active interest in Daggafontein, plans to open three additional extraction plants, with one at Western Reefs Exploration and Development Company, Ltd. in the Klerksdorp district going into production very shortly. The plants will mainly process ores from the gold-bearing Kimberley Reef, where uranium and iron pyrite concentration is higher than average, and where mine development is so advanced that no special mining operations are needed.

A total of 13 uranium recovery plants, representing British-American investment of more than $112,000,000 will be opened in South Africa within the next few years.

Mine Firm Controls Sole Rhodesian Coal Source

Anglo-American Corporation has assumed technical control of the Wankie Colliery in Southern Rhodesia, sole source of coal for Northern and Southern Rhodesia and fuel supplier for Rhodesian copper mines. Under the management of Powell Duffryn, Wankie's production has been increased 50 percent during the past three years to its present level of over 2,750,000 tons per year. Anglo-American plans substantial capital expenditure and development and will try for an output of 5,000,000 tons per year by 1956.

This may well be the answer to the critical fuel shortage at the Rhodesian copper mines where it is used for power generation and smelting. Mines have had to close or to limit production because of inadequate power. Over 80,000 acres of timber have been felled in the copperbelt to ease the situation, and the forestry department has become seriously concerned about the reforestation program when cutting is way ahead of planting.

No. 3 Nome Gold Dredge of U.S. Smelting Co. Sinks

The No. 3 connected bucket-line gold dredge of the United States Smelting, Mining and Refining Company at Nome, Alaska, turned over and sank in its pond late in May. Probable cause of the sinking was winter ice breaking away from the wooden hull and taking caulking with it which permitted water to fill the hull.

The dredge was built in 1924 and had been digging on the third beach line near Anvil Mountain two miles from Nome. The dredge weighed 2,000 tons, was 140 feet long, had a beam of 56 feet, and dug to 74 feet below the water line.

The pond will be pumped dry, the dredge inspected, and a decision then made in regard to reflotation, according to James D. Crawford, vice president and general manager of the company who flew from his Fairbanks, Alaska, headquarters to inspect the dredge.

CUBA—The *Minas de Matahambre* interests are re-equipping and cleaning out

RECOGNIZE ANYONE IN THIS PICTURE?

The above picture was taken on July 4, 1903 in the little mining town of Parral, Chihuahua, Mexico. H. B. Piggott, now a San Francisco mining man, was then the batboy shown in the first row. Mr. Piggott has offered to send free duplicates of the above picture to any members of the baseball team who are still alive. Included in the photo are: CALHOON, yell leader; CARPENTER, shortstop; B. WILSON, center field; KENNEDY, second base; M. WILSON, left field; BUTLER, third base; LOPEZ, catcher; DALTON, first base; FLINN, right field; ANGLE, pitcher; JAY LONG; RAY; and HAL PIGGOTT. Mr. Piggott may be reached at 667 Mission Street, San Francisco, California. (Watch MINING WORLD for future articles about mining in the Parral area 50 years later.)

the *Mona* mine located in the Matahambre district of the island. The Mona has been a producer of copper three times in the past when market conditions permitted. Martin Lleras is the engineer in charge. Also in the Matahambre district, Cuban interests are reported to be making a well-financed effort to put the *El Francisco* mine of *Minera Occidental Bosch, S.A.* into production. The El Francisco originally had over 4,000 feet of development work completed on four levels, but no mill was ever constructed and no production had ever been started because of unfavorable market conditions. Jose Elortegui is chief engineer.

BRAZIL—*Proberil, S.A.* will sell $150,000 worth of beryl to the United States through the Defense Materials Procurement Agency. The DMPA has agreed to advance up to $50,000 to help get pegmatite mining under way. The contract specifies a price of $50 per metric ton unit of beryl concentrate f.o.b. Brazilian port of embarkation.

MEXICO—What is reported to be the richest gold strike in modern times in Mexico is now being investigated by the *Institute for the Investigation of Mineral Resources.* In preliminary assays the ore showed 37 kilograms of gold per ton. The find was made by Adan Uresti Gonzalez, a small independent miner who had been prospecting for iron deposits near Clavellinas in the municipality of Concepcion del Oro, Zacatecas. He has filed six claims of 225 acres each and has started mining by primitive methods.

ARGENTINA—Measures are being taken by the *Cooperativa del Talce* (producers of talc) of Mendoza to obtain the installation of a mill in the same locality where development work is under way.

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HONDURAS—*New York & Honduras Rosario Mining Company* reports that its net profit for the first quarter of 1953 totaled $395,117. Net profit during the same period of 1952 was $1[illegible],846, but the company advises stockholders not to attach undue importance to this unusual difference. Conservative mining practices of the company in the past have preserved the higher grades of ore upon which the mine is now operating. If the present or higher prices of silver continue, this naturally means higher earning from the *Rosario* property. However, unless unexpected extensions of ore bodies are located through exploration at the property, the mine will have reached a stage of unprofitable operations during 1954.

BOLIVIA—*Patino Mines & Enterprises Consolidated, Inc.* has advised its stockholders that negotiations with the Bolivian government agency *Comibol* for settlement of the value of their nationalized tin mines may take a long time. A tentative agreement was reached which was to provide Patino with five percent of the gross proceeds of Bolivian government sales of Patino tin, but now the government has requested a reduction of this figure "because it cannot afford a five percent retention." The Bolivian government is producing tin from the Patino mines and selling it under contract to the William Harvey smelter in Great Britain.

CUBA—*Freeport Sulphur Company's* newly discovered deposit of nickel ore in Cuba is estimated to contain over 500,000 tons of nickel metal and over 50,000 tons of cobalt. The Moa Bay deposit is located so near to the coast that the output of the grinding and pulping plant at the mine reportedly will be pumped to a processing plant at tidewater, with the briquetted metal shipped directly from that plant. Initial output is estimated to be about 30,000,000 pounds annually, and production may possibly get under way by 1955. Actual operation depends somewhat on the results of a pilot plant being built by Freeport to test a new Chemico process which may produce a pure nickel metal rather than the nickel oxide produced at the Cuban *Nicaro* plant. The Nicaro process uses ammonia to leach fine ground roasted ores; Freeport plans to use sulphuric acid.

TRINIDAD—*Golden Cycle Corporation* of Colorado Springs, Colorado is reported to have investigated an open-pittable iron ore deposit in Trinidad where some 35,000,000 tons are said to be available.

MEXICO—The *Dos Carlos* mining cooperative reports that it must cease operations unless funds are provided by the state and federal governments. The directors have announced that present ore bodies are exhausted and that there is not enough money to pay wages or to prospect for further deposits. The governor of Hidalgo state is conferring with the Ministry of Finance over the problem. About 300 miners would be affected by the close down. *Dos Carlos* is Mexico's pioneer mining cooperative. It was formed in 1938 when the British-owned *Cia. Minera Dos Carlos, S.A.* withdrew because operations were no longer profitable and turned its properties over to the miners.

PERU—*Cerro de Pasco Corporation* expects the first unit of its new electrothermic zinc plant to go into production in August or September. Full production of refined zinc at around 200 tons per day will be achieved in 1957. Total estimated cost of zinc development is about $44,000,000; about $21,000,000 has al-

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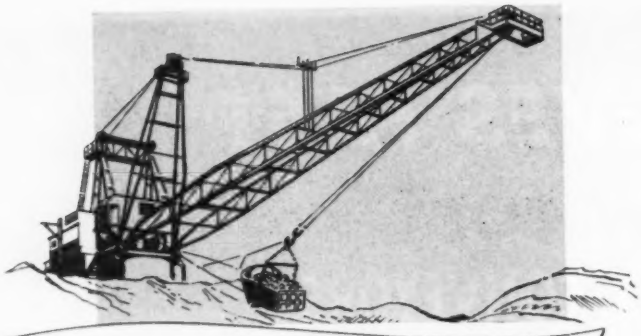

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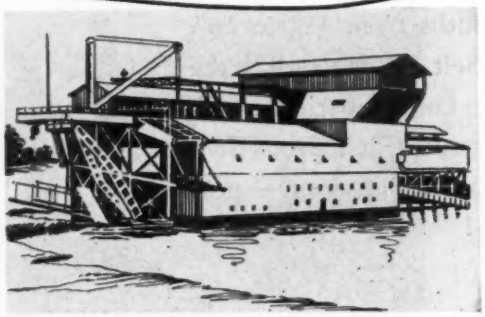

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ready been spent and another $2[illegible]
000 will be spent over the next three
one-half years. Zinc now is a major pro
uct of Cerro de Pasco with current pro
duction more than twice that of lead
almost three times that of copper. Low
metal prices cut into the firm's first
ter earnings this year despite to
sales which were ahead of last ye
sales. Net earnings for the first
months in 1953 were $[illegible],071, compa
with $3,275,014 in the same perio
1952.

SURINAM—One of the main feat
in the government's plan for increa
the country's mineral potential is
$65,000,000, 10-year development pro
gram which calls for, among other th
the expansion of the geological sur
group, and better communicatio
Closely connected with this program
$75,000,000 *Brokopondo* hydroel
project which includes a 160-foo
dam in the Surinam River near Bro
pondo, a 100,000 to a 120,000-kw. hy
electric power plant, and an alumi
industry with a capacity of 30,000 to
000 tons of aluminum annually.

PUERTO RICO—A new map of Pu
Rico, using shaded relief techniq
outline topography, has been publi
by the *United States Geological Sur*
This is the first topographic map t
clude the lesser islands under the Pu
Rico government in their proper p
tions. Copies may be obtained from
Geological Survey in Washington, D.
or from the Commissioner, Departm
of Public Works, San Juan, P.R.

VENEZUELA—At a cost of
$4,500,000, a sulphur refining plant
be set up to produce 250,000 tons
nually of 95 percent pure sulphur.
Venezuelan Sulphur Company, C.A.
build the plant which will take
14 months to complete. The corpora
has already undertaken advanced
ploratory work in the region of El P
Sucre State, where high-grade sul
deposits have been located. Most
exploratory work has been with
"Frasch" method. The sulphur will
transported from the mines to the p
a distance of 10.5 miles, by means
aerial cable system.

SURINAM—The details of bauxite
gold exports from Surinam in 195[illegible]
1952 shown in table on page 115 of
1952 Yearbook should be changed to
as follows: The Paranam mine belong
the Surinam Bauxite Company, Ltd.
place of Department of Public Works
Traffic should be Billiton Company, Ltd.
as operators of the Onverdacht ba
mine.

AFRICA

UNION OF SOUTH AFRICA—*East Champ d'Or Gold Mining Comp Ltd.* is the latest firm scheduled to come a uranium producer. While su cient quantities of uranium-bearing have been found to justify develop there is not enough to justify erecti a treatment plant. Therefore, arra ments have been made with the *fontein Estates Gold Mining Comp Witwatersrand Limited* for the latter expand its treatment plant in order

handle East Champ d'Or slimes. The uranium-bearing slimes will be pumped to the Randfontein plant as soon as certain modifications have been made by both firms. Pumping operations are expected to be under way by 1954.

NORTHERN RHODESIA—*Roan Antelope Copper Mines Limited* is one of several *Selection Trust* copper companies planning to transfer head offices from London to Lusaka in Northern Rhodesia. The move is expected to be made this month.

GOLD COAST—*Kwahu Mining Company (1925)* plans to effect amalgamation of *Mount Elliott Limited* by purchasing that company's undertakings and assets which include shares in *Esperanza Copper and Sulphur Company* and *Bisichi Tin Company (Nigeria), Ltd.* Elliott is already substantially interested in both firms. Esperanza's subsidiary, *Cyprus Sulphur and Copper Company, Ltd.*, operates a sulphur and pyrite concession on Cyprus. A new treatment plant is being erected to take full advantage of the ore now being mined. There have been evidences of gold, copper, and zinc.

UNION OF SOUTH AFRICA—At *S. A. Minerals Corporation, Ltd.'s* chrome mine in the Rustenburg district of the Transvaal, several new shafts have been brought into use since the first of the year. Shipments, however, are still limited by lack of rail transport to Lourenco Marques. Chrome ore shipments totalled 10,866 long tons, realizing £83,517 on a basis of 48 percent Cr_2O_3 content during the first quarter of 1953. Current shipments are now bringing £9 per long ton of 48 percent ore, compared with an average of £7 12s in the first quarter.

NORTHERN RHODESIA—*Selection Trust, Limited* reports that the cost of equipping and developing the *Chibuluma* property (*Chibuluma Mines Limited*) will be £6,000,000 compared with the original estimate of £3,600,000. The increase has been caused mainly by an unforeseen rise in the cost of equipment, labor, and materials, and in advances in housing standards. The U. S. Defense Materials Procurement Agency has arranged to increase its original loan of £3,000,000 by not more than £2,000,000, provided *Mufulira Copper Mines Ltd.* increases its shares in the company from £600,000 to £1,000,000. The additional loan, like the original, is repayable in metals, and the United States will have a prior option on 19 percent of Chibuluma's cobalt output, compared with the original 10 percent arrangement. Copper production may now begin in the latter part of 1955 instead of 1956 as originally planned.

SOUTH WEST AFRICA—Output of *Consolidated Diamond Mines of South West Africa Ltd.* increased to 512,674 carats in 1952, over the 478,075 produced in 1951. Production exceeded 50,000 carats per month on occasions, but late delivery of equipment prevented the maintenance of this high rate continuously. Overburden stripped and ground mined during the year amounted to 4,585,361 cubic meters or 8,600,000 tons. Prospecting operations were extended and considerable new areas have been added to the reserves. A second screening plant was erected in one area, and two similar plants commissioned in another. The heavy media separation plant operated efficiently; continuous grease belts and electrostatic separation were successfully introduced to eliminate hand-sorting of diamonds.

UNION OF SOUTH AFRICA—Drilling has yielded encouraging gold values in the Kimberley Reef within a limited area of ground held under option in the Bethal and adjoining districts, reports the *Union Corporation. Capital Mining Areas*, a subsidiary, has been drilling in that district for two years, and increased the area held under opiton last year. The specific area is not clearly defined but it is believed that the center of activity may be at Kinross, about 20 miles west of Bethal. The bulk of the options (amounting to 50,000 morgen) has been apportioned among five new small exploratory companies, subsidiaries of Union Corporation, leaving Capital Mining Areas to devote its time to the encouraging results obtained in the Kimberley Reef. The five companies are *Acacia Mines, Keurboom Mines, Wonderboom Mines, Maple Mines*, and *Poplar Mines*.

SWAZILAND—Mineral production in 1952 increased in value over the previous year by £479,533 bringing the total up to £2,388,195 which is a new record figure for the country. The increase was due almost entirely to an increase in the average price of asbestos fiber. There was an increase in tin production, with a corresponding increase in value, even though the average price of metallic tin dropped during the year by £57.6 per ton. Gold production has ceased entirely. Production of barite fell off slightly (525.30 tons in 1951, compared with 444.57 tons in 1952) because of the reorganization of milling machinery with a subsequent loss in production hours. Principal output was as follows: asbestos, 34,769.2 short tons in 1952, compared with 34,964.1 tons in 1951; metallic tin, 40.17 short tons in 1952, compared with 35.33 short tons in 1951; gold, 0.58 fine ounces in 1952, compared with 321.85 fine ounces in 1951.

EGYPT—Consideration is being given to several mining proposals, among them: development of a large deposit of ilmenite near the Red Sea; the expansion of manganese mining operations on the Sinai Peninsula; gypsum production near the Red Sea; and beneficiation of black sands from the Rosetta branch of the Nile River near Alexandria.

SOUTHERN RHODESIA — The *Vanad* chrome mine of the *Rhodesian Vanadium Corporation* is installing a flotation section in its new mill. Two Wemco 2-cell attrition machines will be used.

EIRE—*Silvermines Lead and Zinc Company, Ltd.*, which owns properties in Tipperary County, has closed down mining and milling operations because it cannot operate on a profit basis at current lead and zinc prices. To operate economically, the mill throughout would have to be increased from 200 to 400 tons per day. An additional plant has been purchased and will be installed by December. In the six months ended March 31, production amounted to 1,000 tons of 60 percent lead concentrate compared with 519 tons in the previous six months.

AUSTRIA—New talc deposits have been found near Mautern in Styria province, but it is uncertain whether the deposits will be large enough to warrant large investment of funds. The present Styrian talc output is about 62,157 metric tons from the *Oberfeistritz, St. Kathrein*, and *Naintsch* mines, a 260 percent increase over 1937 production.

CZECHOSLOVAKIA—Iron and steel will be exported to China, who, in return, will send metal ores and concentrates to Czechoslovakia. The 1953 trade agreement contains a 20 percent increase in value over last year's agreement.

BULGARIA—Forty percent more iron ore was produced in 1952, thus permitting

HARTEBEESTFONTEIN SINKS FIRST SHAFT

The Minister of Mines for the Union of South Africa has granted the mining lease applied for by Hartebeestfontein Gold Mining Company, Ltd. to mine in the Klerksdorp area. Work preparatory to shaft sinking has been in progress since January and full-scale shaft sinking is expected to begin as soon as surface installations are completed. The photograph (right) shows the reinforced concrete headframe under construction. A concrete mixing plant is at the left. Initial power requirements for the mine will be supplied from a 3,000-kw. power station now being erected near Koekemoer Station. No. 1 shaft will be a 21-foot-diameter circular shaft, concrete-lined throughout, and similar in construction to the circular shafts sunk on other Anglovaal mines in the Orange Free State goldfields. The shaft is estimated to intersect the gold reef at about 3,000 feet. An initial milling capacity of 50,000 tons of ore per month is planned, with an increase gradually to 100,000 tons monthly.

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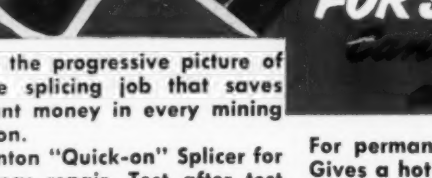

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a pig iron production of 46 percent above the planned amount. Greatest mineral increase claimed during the year by the State Statistical Bureau was in the mining of lead where the plan was exceeded by 120 percent.

ITALY–Capacity at the Vado Ligure zinc refining plant of the *Societa Montecatini* is being increased. The new plant, which processes ores and concentrates imported from Sardinia, will allow for a 20 percent increase in the output of refined zinc and a 10 percent decrease in operating costs.

BELGIUM–*La Vieille Montagne* has conducted successful experiments with its special process to recover germanium. A substantial amount is reported to have been produced in 1952, although figures have not been released. The company produced 126,575 tons of slab zinc and 24,749 tons of rolled zinc, last year.

UNITED KINGDOM–*Consolidated Zinc Corporation, Ltd.* reports that its profit dropped from £7,800,000 in 1951 to £3,800,000 in 1952. *Imperial Smelting Corporation, Ltd.*, a subsidiary, reported a drop during the same period from £4,200,000 to £1,500,000. During 1952, the price of lead averaged £136 per ton, and the price of zinc £150 per ton, compared with £162 and £171 in the previous year. Further decreases expected for this year with continued low prices.

YUGOSLAVIA–Iron ore production is expected to increase this year and next. At Zenica three big blast furnaces are under construction, each with a capacity of 600 metric tons per day. The first is nearing completion, the second is being equipped, and construction has just started on the third. At Vares, the mines are being mechanized and expanded. About 4,000,000 Dinars will be invested in the mines this year, part of this to include strengthening the railway line between Vares and Zenica because Vares will have to deliver 2,000 tons of iron ore to Zenica every day. New iron ore deposits have been found at Beslinac in Croatia and near Zagreb at Samobor.

SCOTLAND–Good progress is being made in dewatering the old lead workings at Wanlockhead and Leadhills where £150,000 is being spent by *Rio Tinto Company, Ltd., Siamese Tin Syndicate Ltd.*, and *Bangrin Tin Dredging Company Ltd.* Pumps are at work but it will take several months before the mines can be completely drained. (The water has accumulated since 1934.) Experts will go underground shortly to examine the deposits before deciding whether to proceed with stage two of the venture–expenditure of an additional £350,000. The mine was closed down as unprofitable when the lead price was £14 per ton. At £80 per ton, it is believed that the mine could function with a good margin of profit.

AUSTRIA–*Underlaussa* has increased its production goal for bauxite to 10,000 metric tons during 1953. Actual production in 1952 was 8,000 metric tons. The company plans to ship the entire output to Bavaria (West Germany's southeast province) for processing. Almost the same volume of bauxite, which, due to its structure, is unprocessable for aluminum production, will be used as a slag-forming medium in the Austrian open-hearth furnaces, for the production of Korund, and for the manufacture of artificial stone.

THE NETHERLANDS–*Maastrichtse Zinkwit Maatschappij* (*Maastricht Zinc White Company*) has requested permission to build a new plant for cadmium production at Limmen. Initial output would be 50 tons annually. The plant would be in the province of Limburg, and it is the permission of the provincial authorities that the firm is seeking. The company started cadmium production before the war but had to cease operations.

NORWAY–A/S *Sydvaranger* exported 205,000 tons of iron ore concentrates during the first four months of 1953. The plant at Kirkenes expects to meet its 800,000 tons export goal for this year.

PORTUGAL–During the first quarter of this year, the country exported 730 tons of wolfram ore, compared with 902 tons in the same period of last year. Part of this reduction was caused by reduced shipments to Great Britain (222 tons, compared with 300 tons) and a curtailment in shipping to France and Germany who took 177 tons and 103 tons, respectively, during the same period last year. United States imports of wolfram from Portugal increased from 317 tons in 1952 to 508 tons in 1953.

SWEDEN–*AB Zinkgruvor* (*Zinc Mining Company*) has completed expansion of its concentrating facilities and the plant is now ready for production. Output will be increased from 100,000 tons per year to 250,000 tons annually. The ore deposits at Odalfalt are considered to have reserves sufficient for several decades of continuous mining. They contain zinc, lead, copper, and some gold and silver.

ALBANIA–Mining output is to be increased by 300 percent over the 1950 production total, during the last year of the current Five-Year Plan–that is, in 1955. While 2,136,000 lei were invested in Albania's mining industry during the

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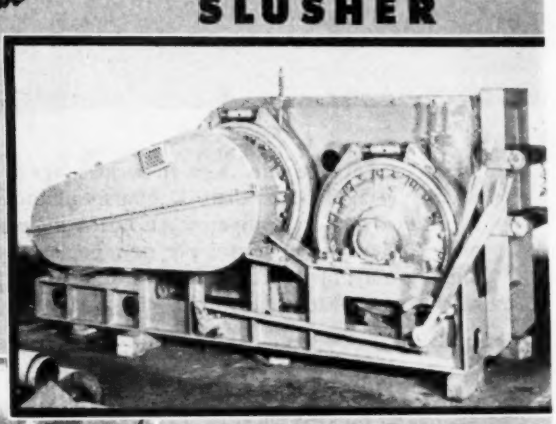

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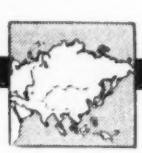
first Five-Year Plan (1946 to 1950) ... amount for the second plan (1951 ... 1955) will be 8,943,000 lei. 120 ... metric tons of chromium ore are sch... uled to be produced in 1955, compa... with 50,000 metric tons in 1950 ... 70,000 in 1952. The copper mines ... to produce enough copper ore to yie... total of 2,500 metric tons of refined co... per during 1955, compared with ... claimed actual production of 900 me... tons in 1952.

HUNGARY—Reports from Budapest ... that about 50 percent of the total ba... ite production from Hungary is pro... essed domestically, while the rest ... being exported to the U.S.S.R. The Hu... garian mines are estimated to have ... serves of 300,000,000 metric tons. Ad... tional deposits have been proven in t... Bakony Mountains, about 10 miles w... of Budapest.

NORWAY—According to present ... culations, the three electric pig ir... smelting furnaces being constructed ... Moi Rana will be ready to start prod... tion at the end of this year. Electric fu... naces are being installed in the st... works, which are to begin operations ... the summer of 1954. Iron ore will co... from the *Sydvaranger* mines and p... sibly later from the *Dunderland* fields. ... nearby quarry will furnish the flux... limestone needed.



ASIA

BURMA—Mineral exports from Ta... during the first three months of 19... were as follows: wolframite ore 61... long tons; mixed tin and wolframite ... 164.7 long tons; and tin concentrate ... 122.4 long tons. The United States re... ceived 446.5 tons of the wolframite ... 98 tons went to the United Kingdo... 25.2 to the European continent, and ... tons to Japan. The United States receiv... 80 tons of the mixed tin and wolfram... 83.2 tons went to the United Kingdo... and 1.5 tons to the European continen... The Federated Malay States receiv... 82.25 tons of the tin concentrate, a... 40.15 tons went to the United Kingdo...

JAPAN—Sizable amounts of Japane... capital have been invested in southe... Asia in a move to secure more iron ore ... the country. The Philippine Islands, Ho... Kong, and Malaya have received some ... the financial aid for mine developme... and negotiations are reportedly und... way with Thailand (Siam) for develo... ment of its iron mines. Japan has alre... sent about $1,600,000 worth of equi... ment to Goa, Portugal's possession in I... dia, and first ore shipments are on th... way to Japan. The Japanese are entitl... to mine 1,500,000 tons in Goa over ... three-year period at a discount of $2 ... per ton.

MALAYA—General Sir Gerald Te... plar, High Commissioner for the Fede... tion of Malaya, in an interview with M... ING WORLD-WORLD MINING'S London c... respondent, announced that he will ... permit resumption of tin prospect... upon his return to Malaya. Many of ... industry's troubles have been blamed ... the growing exhaustion of the pres... fields and the need for opening new m... Prospecting has been prevented by gu... rilla warfare, which, the General feels

under control. This summer companies will be allowed escorts for prospecting parties and will be permitted to operate dredges or workings in the more remote parts of the country. Some areas still under Communist control will continue to be restricted.

THAILAND—A delegation from the Association of British Commonwealth Mining Interests met with the Minister of Industry in Bangkok to discuss problems arising from the recently adopted policy of denying renewal of mining leases held by foreign companies. (See MINING WORLD-WORLD MINING, June 1953.) The delegation received no assurance that mining leases held by British companies would be renewed when they expire. British dredging companies produce approximately 50 percent of the country's tin output.

INDIA—The government is still considering the erection of a steel plant but has not yet decided which foreign firm will be permitted to participate in the project. It has been decided that the plant should have a capacity of 500,000 tons and that plate and sheet steel shou'd be the main products. It is estimated that the country's steel requirements in 1957 will be about 2,800,000 tons, of which 2,200,000 tons will be produced by the three existing units after their expansion program. Private firms are also expected to be licensed in the Hirakud and other cheap power areas to use the scrap iron which is presently being exported.

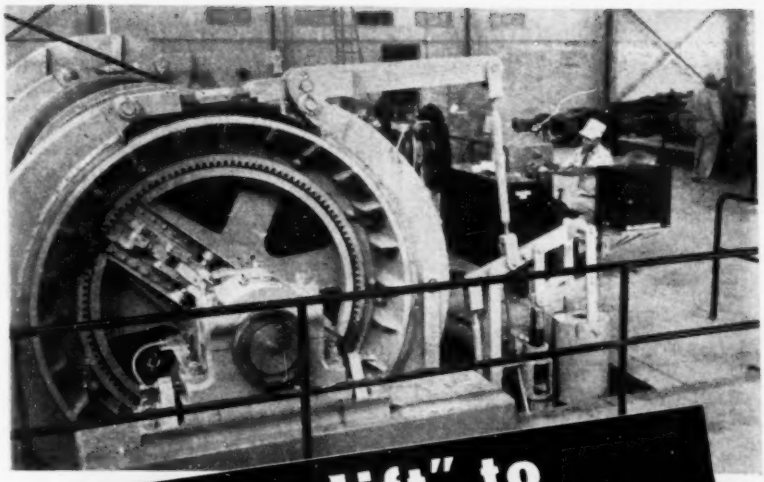
BURMA—Tin exports through the port of Mergui during the first quarter of 1953 totaled 214 long tons, all of which went to the Federated Malay States. The United Kingdom received 13.45 long tons of wolframite ore shipped through the port. *Thabawleik Tin Dredging Limited* exported 173 long tons of tin and local sales supplied the balance of 41 tons. During the first quarter, Thabawleik produced 164.47 long tons. In 1952, the firm produced 968.704 long tons of tin concentrates and shipped 978.112 tons to the Malay States.

JAPAN—Production of electrolytic lead and zinc reached post-war heights during April with output totaling 1,896 tons and 4,848 tons, respectively, compared with 1,856 tons and 4,690 tons in March. Output of electrolytic copper and distilled zinc declined slightly from 7,082 tons and 1,992 tons, respectively, in March, to 6,018 tons and 1,916 tons in April. The Japan Mining Association reports that nonferrous production in Japan is not likely to increase further because of the slump in both domestic and international markets.

THAILAND—Having worked out the property in Pangnga, dredge No. 1 of *Kamunting Tin Dredging Ltd.* shut down in April. Dredge No. 2 was dismantled earlier.

BURMA—Final production figures have been released for the mines in the Tavoy district during 1952—wolframite ore 364.73 tons; tin 176 tons; mixed tin and wolframite concentrates 1,648.7 tons; total 2,191.4 tons. Only four of the five foreign companies were able to work during the year because of insurgent activities. These companies produced 440 long tons of tin and wolframite concentrates during the year, compared with 3938 tons in 1940.

JAPAN—The United Kingdom, paying in sterling, recently outbid the United States dollar bid for 100 tons of silver offered by Japan. The British paid about $2,000,000 for the silver.



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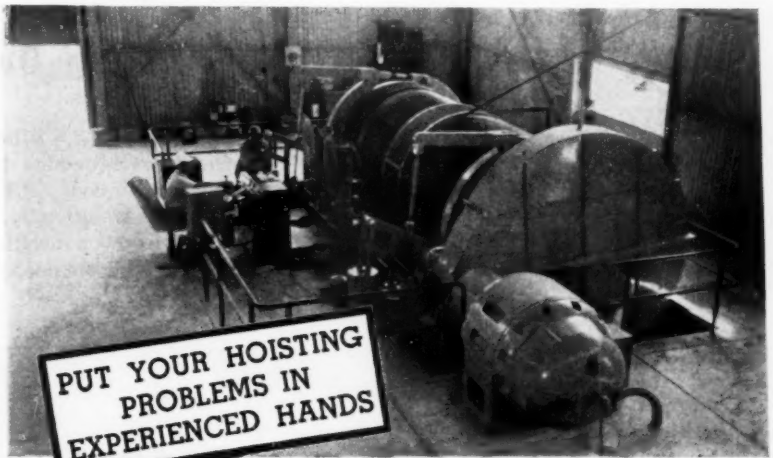

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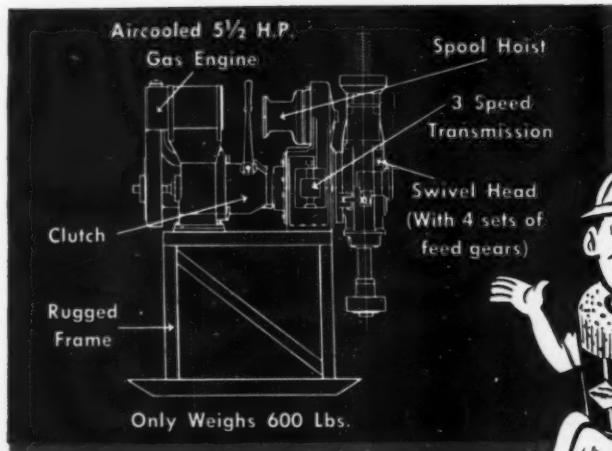

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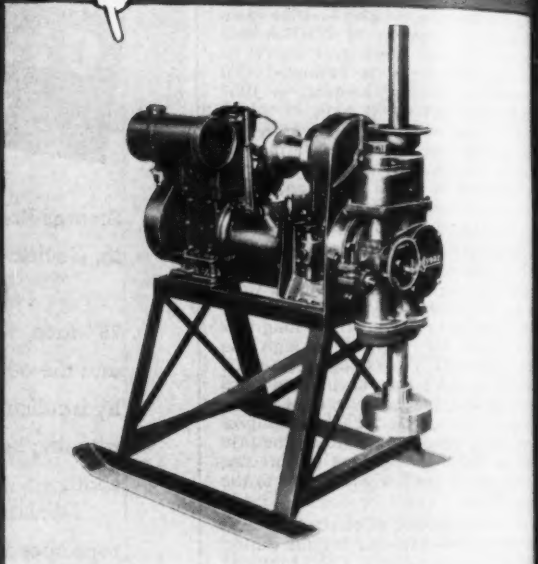

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PAKISTAN—A committee representing the Pakistan Mineowners Association has submitted a memorandum to the Minister for Industries which suggests ways of helping in the development of the mining industry in Baluchistan. The group recommended better roads and transportation facilities; revised coal prices which would make mining more profitable for the operators; granting of permission to buy truck tires; and suspension of restrictions on chrome mining and prospecting rights and leases.

SINGAPORE—The Singapore government has issued an order which tightens control over the destination of tin exports. Exporters must now include in their contracts with overseas buyers, a clause which requires that a certificate of domestic consumption be made available to the seller within two months after date of export. A copy of the customs entry for domestic consumption or other official documents must be submitted from the country of ultimate destination to prove that the import was for the place originally designated. The conditions do not apply for shipments destined for Canada or the United States, and these conditions will not be imposed when tin is sold to or owned by the members of the London Metal Exchange where satisfactory arrangements have already been made for exchange control.

CHINA—It is reported that coal is being mined for the first time in Tibet. A mine shaft is said to have been sunk at Gianda in the district of Kongbo about 150 miles northeast of Lhasa. Coal is transported to the capital for the use of the Chinese troops there. It is said that the natives may begin to use coal for fuel themselves after mining machinery is brought in to produce the coal on a larger scale. At present, the natives use Yak dung for fuel.

INDIA—India exported 306,976 cwts of mica during 1952. The overall export level was fairly well maintained and there did not appear to be any slump in the industry. However, with the disappearance of the sellers' market, buyers are requiring higher standards of quality. The government is taking action to improve the quality of exports by adopting a universal standard for grading mica. The government is also considering other proposals for stabilizing the industry—for example, creation of a central organization to take over export operations, imposition of a ban on the export of scrap mica, and promotion of research work to encourage the use of mica in the country. Following the discovery of small quantities of mica near Mehrauli, the Delhi State Government has asked the Central Government for the services of a geologist to report on the state's mineral resources.

CHINA—A major copper deposit is reported to have been discovered in Kaolan, Kansu province, in the northwestern part of China.

INDIA—*S.K. Sahana & Sons Ltd.* of Kodarma, Bihar, are supplying substantial quantities of good quality mica to the Joint Mica Mission for allied war industries.

PAKISTAN—Mineral resources so far known to occur in Pakistan are chromite, ochres, antimony, copper, iron, magnesite, and manganese. Only chromite and ochres are being mined at present. Possibilities of economic development of other ores are being explored. The only mineral ore being exported at present is chromite of which Pakistan shipped 21,745 tons in 1949, 16,018 tons in 1950, 20,305 tons in 1951, and 15,614 tons in 1952. Exports were mainly to the United States, the United Kingdom, and Norway.

OCEANIA

PHILIPPINE ISLANDS—The Philippine congress has voted to eliminate the royalty tax on gold output ranging from 1.5 percent and is also exempting hard pressed producers from the payment of the 7 percent compensating tax. This provides partial relief for the 15 operating gold mines whose total investment is estimated at Pesos 36,691,000, but does not encourage the operation of any marginal mines. Other tax relief measures which have been sought include release from the 17 percent tax on foreign exchange and the 28 percent income tax on corporations. Gold mines point out that the encouragement of their dollar producing industry would greatly assist the Philippines' tottering economy.

NEW SOUTH WALES—The *Whipstick* molybdenite mine near Pambula on the southern coast may be reopened by *Mundus Trading Company* of Sydney. Samples from a newly located vein are said to be very rich and show "a good prospect of making Australia self-supporting in the metal." Between 1912 and 1920, 112 tons of concentrates were produced from the mine.

FIJI ISLANDS—*Emperor Gold Mining Company, Ltd.* reports that for the 12-week period ending April 29, 49,920 tons of ore were treated to recover 19,126 ounces of gold. This was the best yield for some years. The previous 12-week period produced 10,223 ounces from 30,312 tons of ore.

PHILIPPINE ISLANDS—The construction of a sintering plant in Bohol for the treatment of the manganese ores produced by *General Base Metals, Inc.* has been started. The company is also undertaking construction of an improved washing plant to increase recovery and as an accessory to the proposed sintering plant. The company has two 200-ton-per-day washing plants located along the seashore, a kilometer away from the mining site. They are provided with a motor pump, six washing boxes, and a small ore bin. A 4-inch-diameter steel pipe extending about 60 feet from the plant to the sea, conveys the pumped water to the washing boxes. The tailing is drained into the sea.

NORTHERN TERRITORY—The Commonwealth government has increased the local price of uranium in order to encourage private development of the industry in the Northern Territory. The increase will return to miners a price comparable to the rate which the United States Atomic Energy Commission has agreed to pay to the Australian government under its 10-year agreement. The final factors determining price will be the stage of refinement of the ore and the place where it is bought.

NEW ZEALAND—During the first half of May, *Arahura Gold Dredging Ltd.*

TIN RECOVERY FROM SEA BOTTOM

In this mining operation off the Island of Banaka, Indonesia, Tournarockers, powered by Tournapulls, are used to haul heavy clay and quartz for use in the building of dikes. The dikes, built out into the sea, are made of a reinforced timber framework filled with clay and rock. The dike-surrounded areas are sealed off from the sea so that tin may be reclaimed from the alluvial deposits. The tin-bearing gravel, mixed with water, is pumped into washing sluices for tin recovery. Normally, off-shore digging can be done by connected bucket-line dredge, but in this area large boulders make it impossible to dredge.

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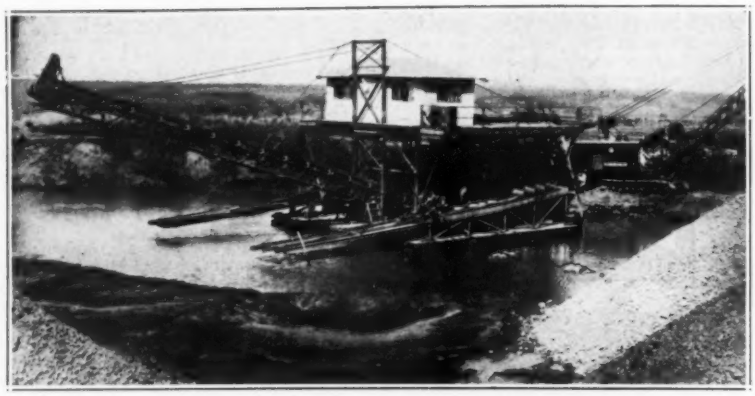

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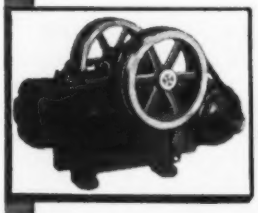

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dredged 122,[illegible]09 cubic yards for a recovery of 198 ounces of gold bullion. *Kanieri Gold Dredging Ltd.* dredged 51,000 yards for a recovery of 209 ounces of bullion.

PHILIPPINE ISLANDS—Installations of *Philippine Iron Mines, Ltd.'s* washing plant for the treatment of eluvial material is making progress. The plant is expected to start processing some of the material as soon as a system of feed for the plant is developed. No new developments have taken place in the construction of the pilot mill for research and experiment in treating lower grades of ore, but work is continuing on this project and the mill may be in operation soon.

TASMANIA—Production of *Mount Lyell Mining and Railway Co. Ltd.* for the half year ended March 31 was higher than for the corresponding period last year. 728,398 tons of ore were treated, producing 14,635 tons of concentrate which were smelted with a further 3,000 tons from stock. Blister copper produced in the period was 4,297 tons and cathode copper 4,307 tons. 4,265 tons of electrolytic copper were produced during the period; 11,887 ounces of silver; and 2,625 ounces of gold.

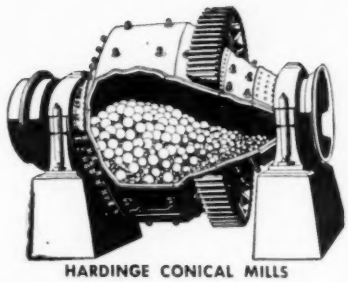
NORTHERN TERRITORY—*Whippet Consolidated N.L.* will work the *Red Cross* tin lease at Maranboy; *The Broken Hill Proprietary Co.* recently released its options on this property.

QUEENSLAND—Output of *Mount Isa Mines Ltd.* was largely unchanged during April: silver-lead bullion 3,060 tons; zinc concentrate 2,898 tons; blister copper 1,030 tons. In four weeks to May 2, *Golden Plateau N.L.* produced 1,259 ounces of gold from 2,030 tons. The mine is at Cracow. Operations at *Kingston (Open Cut) Gold Mines Ltd.* ceased on May 8. Latest recovery figure showed a grade of 2.04 dwts per ton.

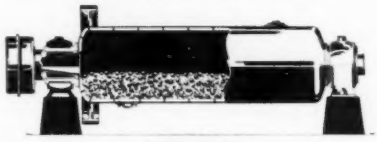
PHILIPPINE ISLANDS—A contract which *Nielson and Company* has with the *National Power Corporation* calls for delivery of pyrite ore as a sulphur source, crushed to 1¼ inches. This would necessitate installation of a complete crushing plant, so the firm has decided to install an ore dressing plant with a 200-ton daily capacity which would perform two jobs. It would crush the pyritic ore to the required fineness, and would also be used to treat between 12,000 and 15,000 tons of pyrite which remain in the old prewar and Japanese waste dumps at the *Hixbar* copper mining property on Rapu Rapu Island.

SOUTH AUSTRALIA—The State Government has approved construction of a 3-foot 6-inch gauge spur railroad line from Cutana to Radium Hill at a cost of £A250,000. It is hoped that it will be completed by September. The government has a huge uranium project at Radium Hill. A 52-mile pipeline is being built from Umberumberka reservoir, capable of delivering 50,000,000 gallons of domestic water annually. This is one of the Broken Hill, New South Wales, reservoirs. Until recent completion of the Menindie-(Darling River)-to-Broken-Hill pipeline, Broken Hill was often short of water and it was carried by train from Menindie. This part of Australia only gets 7 inches of rain per year.

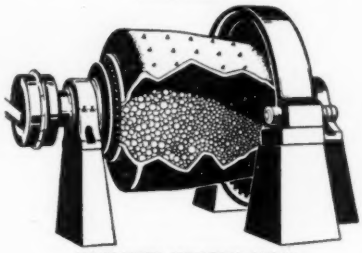
PHILIPPINE ISLANDS — *Paracale Gumaus Consolidated Mining Company* has signed a milling agreement with *Demonstration Gold Mines* to mill Paracale Gumaus ore at the Santa Barbara plant which is being installed on the adjoining property. The mill should be



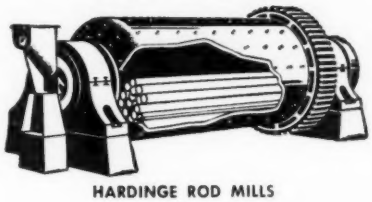
HARDINGE CONICAL MILLS



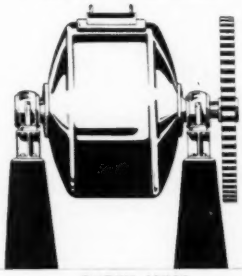
TUBE MILLS



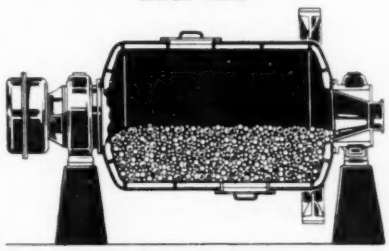
HARDINGE TRICONE MILLS



HARDINGE ROD MILLS



BATCH MILLS



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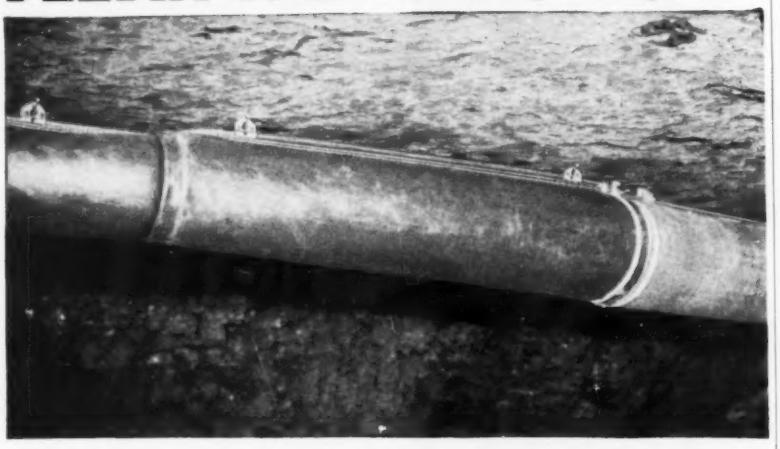

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completed shortly and [illegible] that the Paracale Gumaus hopes to [illegible] in a position to deliver 50 to 70 tons of ore per day from its mine near Paracale, Camarines Norte.

BRITISH COLUMBIA—*Reeves MacDonald Mines Ltd.* has discontinued milling of zinc-lead ore at Remac until operating costs drop or metal prices rise. The firm ceased stoping activities several months ago, but is continuing development work underground, including deepening of the incline shaft. The shaft has been sunk 300 feet below the River Tunnel level and plans call for sinking an additional 700 feet.

SASKATCHEWAN—Diamond drilling is under way on the 15-claim uranium property of *Brunston Mining Company* on the east side of Beaverlodge Lake. Holes are being drilled at 75-foot centers along a northeast striking fault where geiger counter work indicated radioactivity. At the firm's 40-claim Elmtree district property in New Brunswick, camps have been erected and surface work is underway. Drilling is also planned on 45 claims in the Bathurst area of New Brunswick.

ALASKA—Antimony operations have started at the *Stampede* property of Ed Pilgrim about 115 miles south of Fairbanks. Prospecting and exploration work is being done under a $62,000 DMEA loan granted last August. The government's share in the project is $46,500. All material and equipment has to be flown in to the property since there are no connecting roads. Mr. Pilgrim spent the winter working with Elmer Stohle on tungsten explorations for the *Alaska Metals Mining Company* at Gilmore Dome. This firm also has a DMEA loan—in the amount of $178,234, of which the government will spend $133,675.50.

NORTHWEST TERRITORIES—The *Don Cameron Exploration Company Limited* has approved an arrangement with M. J. Boylen for performance of 5,000 feet of diamond drilling on its *Ennadai Lake* claims this summer, with an option to Mr. Boylen to make further expenditures and obtain an interest in the company. Also on the 1953 schedule is an expedition under Dr. Z. L. Sukowski which will do further prospecting on the Rankin Inlet claims before breakup of the ice.

NEWFOUNDLAND — Exploration rights have been granted to *Newfoundland Fluorspar, Ltd.*, subsidiary of the *Aluminum Company of Canada*, for an additional 500 square miles of Burin Peninsula. The company is reported to have originally asked for rights to 2,500 square miles of the peninsula. The firm operates the *Director* mine in the St. Lawrence area about 130 miles southwest of St. John's. It expects to double its output within the next two or three years in order to supply Alcan's aluminum smelter at Katimat, British Columbia with metal fluorspar concentrates.

ARIZONA—The *Banner Mining Company* of Tucson has received a DMEA contract which calls for production of 12,960,000 pounds of refined copper over a three-year period. Production is to begin in May 1954. The government will buy the refined copper at 31¢ per pound.

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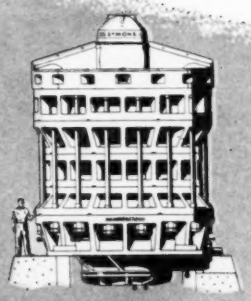
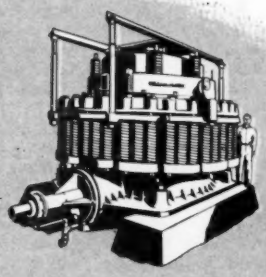


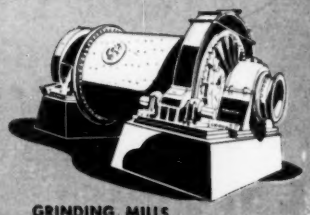
SYMONS PRIMARY GYRATORY CRUSHERS



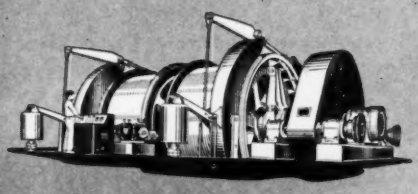
SYMONS CONE CRUSHERS

SYMONS VIBRATING SCREENS

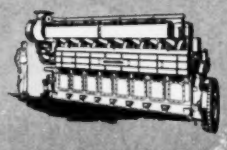
SYMONS VIBRATING GRIZZLIES



GRINDING MILLS



MINE HOISTS



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f.o.b. middle western markets and has an option at the market price on all molybdenum produced. DMPA will advance up to $473,665 for the project. The firm's properties, known as the *Mineral Hill* group and the *Plumed Knight* group, are located in the Pima mining district of Pima County.

ALASKA—Operations have started again after winter shutdown at the *Havenstrite Mining Company's* property near Candle. About 20 men reportedly will be on the crew of the dragline operation at the placer gold mine. With the light snowfall in the Seward Peninsula area during the winter, it is expected that there will be a shortage of water vital to the operation during the summer working period.

BRITISH COLUMBIA—*Sheep Creek Mines Ltd.* is making plans to bring a third property into production. Low base metal prices had forced the closing of the *Paradise* mine in the Invermere district, and a further drop is expected to close down the *Zincton* mine in the Slocan district. The new operation is the *Mineral King* in the Windermere district. Development work has been going on there for some time and results have been good. Grade of ore and tonnage developed appear to warrant erection of a 400-ton-per-day milling plant.

MANITOBA—*Sherritt Gordon Mines, Ltd.* still expects to have its new *Lynn Lake* nickel-copper-cobalt mine in production by late this year; however, cost will be about 16 percent over the original estimate. Revised figure is $40,574,000, an increase of $5,545,000. Operations are to start with an initial rate of 2,000 tons per day, with the "A" mine providing 1,500 tons and the "*El*" [illegible] 500 tons daily. Development at the "A" is almost completed, while development at the "El" is just starting. A water diversion dam has been started to increase water flow to the power site by 50 percent.

WYOMING—The first batch of alumina from Wyoming's abundant anorthosite (sodalime aluminum silicate) reserves has been produced in the experimental alumina plant of U. S. Bureau of Mines at Laramie. Test operation of the plant will continue through June 30, 1954. Treatment capacity is 700 tons of anorthosite rock per day to produce 60 to 70 tons of alumina.

NORTHWEST TERRITORIES—*Eldorado Mining & Refining (1944) Ltd.* has started operation of its new mill at Beaverlodge Lake. Initial production capacity is 500 tons per day but it is believed that the plant can handle up to 700 tons per day and has been designed for expansion to 2,000 tons with a minimum of expense. Ore for the mill is first crushed underground and then delivered by a 625-foot conveyor from the Fay shaft to a 200-ton surge bin ahead of the two Symons cone crushers.

NEWFOUNDLAND—The *Newfoundland and Labrador Corporation* has started a $300,000 exploration program with 14 parties in the field. Five are exploring the southwestern section of Labrador and the Mealy Mountain area on the south shore of Lake Melville; the other nine are exploring the southern tip of Newfoundland, including the Burin Peninsula, Fortune Bay, and Gander River. This is said to be the largest single program in Newfoundland's history. Besides the corporation's exploration program, 10,000 square miles will be prospected by parties for the *Newmont Mining Company* and *American Zinc, Lead*

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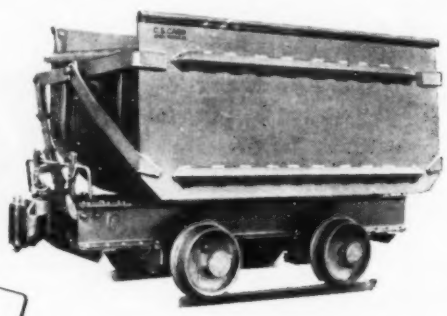

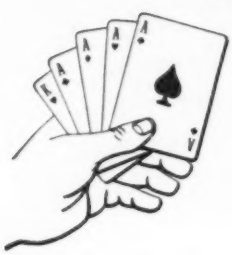

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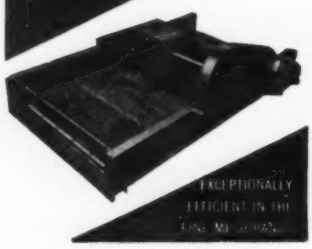

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Euclid Scraper—15.5 cu. yds. struck, 21 cu. yds. heaped at 1:1 slope . . . 275 h.p. engine . . . top speed, loaded, 28.2 m.p.h.

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Rear-Dump "Eucs"—10 to 34 tons . . . 125 to 400 h.p. . . . spring mounted or semi-rigid drive axles . . . top speeds loaded to 36.3 m.p.h.

The EUCLID ROAD MACHINERY Co., CLEVELAND 17, OHIO

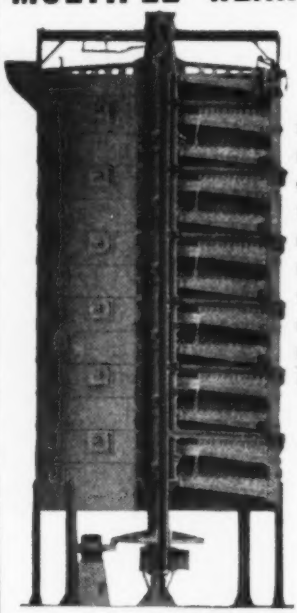
Cable Yuklid — Code Bentley

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

PACIFIC FURNACE

MULTIPLE HEARTH FURNACE



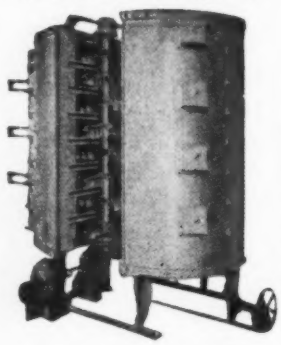
SIZES 8' 6" TO 22' 3" DIAMETER
NUMBER OF HEARTHS, 1-16

ROASTING
CALCINING
DRYING

ZINC ORES	QUICKSILVER
IRON ORES	MAGNESITE
COPPER ORES	LIMESTONE
TIN ORES	MOLYBDENUM
NICKEL ORES	BONE CHAR
LEAD ORES	DIATOMITE
SODA ASHES	LIME SLUDGE
FULLERS EARTH	MAGNESIUM
CARBON	CLAY GRANULES
PYRITE	ANTIMONY

SELENIUM
SEWAGE SLUDGE
LEAD CHEMICALS
METALLIC SLUDGES
FILTERING MEDIA

And for Numerous Other Materials



Pacific Laboratory Furnace

PACIFIC LABORATORY FURNACE

Manufactured in two sizes—36" and 54" inside diameters having 6-8-10 Hearths and include the same features as the commercial size furnace.

Pacific Furnacing Unit

NEW
PACIFIC FURNACING UNIT

Higher shell height. Three gas burners. Provision for conversion to muffle unit. Small volume roasts at any desired temperature.

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Engineers and Metallurgists

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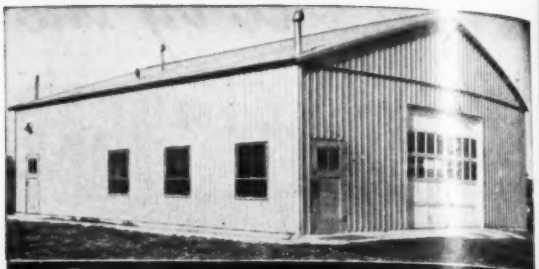

COLUMBIAN ALL-METAL BUILDINGS

Strong • Fire-Safe • Low Upkeep

Columbian All-Metal Buildings are increasingly popular with the mining industry because of their unlimited utility value—for warehouses, engine houses, dryhouses, shops, garages, compressor houses, etc. Prefabricated from quality steel. Sectional construction assures easy, low-cost erection. Exceptionally weather-tight. Rigid, strong, fire-safe. Minimum upkeep. Order from distributors listed below—or write direct for complete information.

COLUMBIAN STEEL TANK CO.
P. O. Box 4048-H, Kansas City, Mo.

Distributors in the United States

Denver Equipment Company
1400 Seventeenth Street
Denver, Colorado

Eimco Corporation
34 South 4th West Street
Salt Lake City, Utah

Distributors—Foreign
Avenida Ejercito Nacional 458-D
Colonia Chapultepec Morales
Mexico, D. F.

ONE WILL DO IT BEST

There's a Coast Safety Fuse for every blasting operation:

TRIPLE TAKE . . . very wet work, rough handling

BEAR . . . wet work, white countered

SEQUOIA BLACK . . . warm climate, heavy water pressure

SEQUOIA WHITE . . . hot climate, inflammable explosives, heavy water pressure

DREADNAUGHT . . . wet work, cool climate

BLUE LABEL . . . dry or damp agricultural and quarry work

REMEMBER COAST'S SPITTERCORD

PRIMACORD - BICKFORD
Hot Wire Fuse Lighters
Detonating Fuse
Safety Fuse
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COAST MANUFACTURING & SUPPLY COMPANY
ESTABLISHED 1867
LIVERMORE CAL.

Ask your powder supplier or write for literature

COAST MANUFACTURING & SUPPLY CO.
LIVERMORE, CALIFORNIA

nd Smelting Company in sub-concessions granted to the companies by the corporation. Another four exploration parties will be from the provincial Department of Mines and Resources to explore the corporation's holdings in Labrador.

UTAH—*Utex Exploration Company* reports that its uranium ore body southeast of Moab, Utah, is 40 feet thick over a wide area, with an average thickness of about 14 feet. The known extent of the ore is 600 feet wide in one direction and at least 600 feet in the other, but the full extent of the deposit is not yet known.

SASKATCHEWAN—At the *Eagle-Ace* mine of *Nesbitt LaBine Uranium Mines, Ltd.*, a first production stope has yielded 200 tons of ore averaging 0.53 percent U_3O_8, equivalent to $76.85 a ton at the $7.25 per pound price for uranium oxide. Much timbering of other stopes is being carried on. At the second level, the 203 south crosscut is being advanced for a drill station to check the downward extension of the vein in 205 which it is thought could be the extension of the 103 occurrence of the first level. It is also planned to check the downward extension of the 104 stope vein.

ONTARIO—*Roy Silver Mines Limited* has purchased a 100-ton concentrator for its cobalt property in the Gowganda area of Northern Ontario, and expects to have it in operation by the middle of September. Plans are being made to conduct further tests on the property after a 60-foot length of one section revealed high Geiger counter readings.

SASKATCHEWAN — *Anglo - Rouyn Mines Limited* has added a fourth diamond drill to speed drilling on its *Waden Bay* copper-gold operation at Lac La Ronge in northern Saskatchewan. Based on a round-the-clock schedule and working to a tier pattern plan of drilling along the ore zone structure, drilling operations along strike have intersected the extension of the main ore zone at slope depths of 530 to 540 feet in a number of places. Reporting on current drilling progress results, A. B. Ferguson, field manager, advises that, in drilling to depth, good widths of chalcopyrite mineralization, which carries the copper-gold values, have been intersected in all holes.

ALASKA—This season's operations at the *Livengood* gold placer mine near Fairbanks have started. *Callahan Zinc-Lead Company*, which had managed the property for the Reconstruction Finance Corporation, will now undertake to operate the property on a profit-sharing lease through its subsidiary *Livengood Placers, Inc.* Prospecting estimates show gravels of sufficient value to yield satisfactory profit if physical problems can be overcome and recoveries more closely approach prospecting values than in the past.

SASKATCHEWAN—*Grand Chibougamau Mines Limited* has acquired a 56-claim group of prospective pitchblende-cobalt ground northeast of the Eldorado discovery in the Foster Lake area of northern Saskatchewan. Diamond drilling and surface exploration will be undertaken shortly by *Technical Mine Consultants, Limited* which will also be in charge of operations on the new *Clix* ground to the southeast.

ONTARIO—*Macassa Mines Ltd.* and *Tungsten Corporation of Canada Ltd.* reportedly are financing a joint airborne scintillometer survey over uranium-bearing ground near Bancroft, Ontario. Macassa holds 18 claims and Tungsten has a 50 percent interest in the 54-claim group of Center Lake uranium.

U.S.A. Metal & Mineral Prices

METALS

June 17, 1953

COPPER:	**Electrolytic.** Delivered F.o.b. cars, Valley basis	29.75¢-30.00¢
	Lake. Delivered, destinations U.S.A.	Nominal
	Foreign Copper. Valley basis	29.75¢-30.00¢
LEAD:	**Common Grade.** New York	13.50¢
	Tri-State Concentrates, jig, flotation 80% lead, per ton	$173.70
ZINC:	**Prime Western.** East St. Louis	11.00¢
	Tri-State Concentrate, 60% zinc, per ton Eagle-Picher	$ 70.00
ALUMINUM:	**Primary 30 Pound Ingots (99%) plus).** F.o.b. shipping points	20.50¢
ANTIMONY:	**Lone Star Brand.** F.o.b. Laredo, in bulk	34.50¢
BISMUTH:	(in ton lots) price per pound	$2.25
CADMIUM:	**Sticks and bars.** 1 to 5 ton lots (Price per pound)	$2.00
COBALT:	**97-99%,** keg of 550 pounds (Price per pound)	$2.40
MAGNESIUM:	**Ingots (99.8%).** F.o.b. Freeport, Texas	27.00¢
MERCURY:	**Flasks.** Small lots, New York	$194.00-$195.00
NICKEL:	**"F" Ingots (5 pounds).** F.o.b. refinery, Port Colburne, Ontario	60.00¢
TIN:	**Grade A Brands.** New York (Price per pound)	121.50¢
TITANIUM:	**99.3%** + (Price per pound)	$5.00-$7.00
GOLD:	United States Treasury price	$35.00 per ounce
SILVER:	**Newly mined domestic.** United States Treasury price	90½¢ per ounce
	Foreign Handy & Harman	85.25¢ per ounce
PLATINUM:		$93.00 per ounce
ZIRCONIUM:	**Powder,** 100 pound lots, per pound	$7.00

ORES AND CONCENTRATES

BERYLLIUM ORE:	**10 to 12% BeO.** F.o.b. mine, Colorado	$45.00 per unit
	Small lot purchases at Custer, S. D., Spruce Pine, N. C., and Franklin, N. H. Visual inspection at $400.00 per short ton or by assaying at: 8.0 to 8.9% BeO, $40 per unit; 9.0 to 9.9%, $45; over 10.0%, $50.	
CHROME ORE:	F.o.b. railroad cars eastern seaports. Long tons dry weight.	
	African (Rhodesian). 48% Cr_2O_3. 3 to 1 Ratio	$44.00-$46.00
	African (Transvaal). 48% Cr_2O_3. No Ratio	$34.00-$35.00
	Turkish. 48% Cr_2O_3. 3 to 1 chrome-iron ratio	$54.00-$56.00
	U. S. Government ore purchase depot Grants Pass, Oregon, Base price, lumpy ore, $115.00; fines and concentrates $110.00 for 48% Cr_2O_3 and a 3 to 1 chromium-iron ratio. Premiums for higher grade ore and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr_2O_3.	
COLUMBIUM-TANTALUM ORE:	At United States small lot beryl purchase depots, $3.40 per pound contained combined pentoxides in 50% ore.	
IRON ORE:	Lake Superior. Per gross ton Lower Lake Ports.	
	Mesabi, Non Bessemer, 51.5% Fe. Second quarter	$9.70
	Mesabi, Bessemer, 51.5% Fe. Second quarter	$9.85
	Old Range Non Bessemer. Second quarter	$9.95
	Old Range Bessemer. Second quarter	10.10
MANGANESE ORE:	**Swedish,** Atlantic Ports, 60 to 68% Fe, Contracts, Per Unit	20.00¢
	Metallurgical grade. 46 to 48% Mn. Long ton unit	$1.15-$1.17
	Chemical grade. 80% MnO_2. Per ton	$70.00
	Domestic U. S. Government ore purchasing depots: Deming, New Mexico; base price $2.30 per long dry ton unit of recoverable manganese less handling and treatment costs. Wenden, Arizona; base price of $8.54 per long dry ton of 15% manganese ore. Butte, Montana; (black and pink ores) base price of $4.87 per long dry ton of 18% manganese ore. Phillipsburg, Montana base price of $6.43 per long dry ton unit of 15% manganese ore. Small lot program f.o.b. railroad cars, minimum 40% Mn. Base price (48%) $2.30 per unit with premiums and penalties.	
MOLYBDENUM CONCENTRATE:	90% MoS_2. F.o.b. Climax, Colorado. Per pound of contained molybdenum, plus cost of containers	$1.00
TUNGSTEN CONCENTRATE:	**Domestic.** 60% WO_3 Per short ton unit	$65.00
	Foreign. 65% WO_3 Per short ton unit	$50.00
URANIUM ORE:	**Carnotite-Roscoelite.** F.o.b. purchase depot plus $0.06 per ton mile ($6.00 maximum), Grand Junction, Rifle, Durango, Naturita, and Uravan, Colorado. Salt Lake City, Marysvale, Thompsons, and Monticello, Utah. Shiprock, New Mexico, Edgemont, S. Dakota. Base price for 0.10% ore is $1.50 per pound and up to $3.50 per pound of contained U_3O_8 plus $0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of $0.25 per pound for each in excess of 10 pounds. A $0.50 per pound development allowance paid on all ores purchases. At Shiprock all ores with more than 6% lime are penalized for excess lime.	
VANADIUM ORE:	**Carnotite-Roscoelite.** V_2O_5 in ratio of more than 10 parts to 1 part of U_3O_8 are generally acceptable at all AEC depots, but excess not paid for at Marysvale, Monticello and Shiprock. Per Pound V_2O_5,	$0.31

NON-METALLIC MINERALS

BENTONITE:	**Minus-200-mesh.** F.o.b Wyoming points. Per ton in carload lots	$12.50
	Oil Well grade. Packed in 100 pound paper bags	$14.00
FLUORSPAR:	**Metallurgical grade.** 70% effective CaF_2 content per short ton F.o.b. Illinois-Kentucky mines	$42.50
	Mexican. 70% f.o.b. border	$30.00
	Acid Grade. 97% CaF_2 f.o.b. Kentucky, Illinois, Colorado	$60.00
PERLITE:	**Crude:** F.o.b. mine per short ton	$3.00 to $5.00
	Plaster grades. Crushed and sized. F.o.b. plants	$7.00 to $9.00
SULPHUR:	Long ton, F.o.b. Hoskins Mound, Texas	$25.50
	Export	$30.50

LONDON METAL AND MINERAL PRICES

		June 12, 1953 Per Metric Ton	USA Equivalent cents per pound[1]
COPPER:	**Electrolytic**	£252 0s 0d	31.50¢
LEAD:	**Refined, 99.97%**	£90 0s 0d	11.25¢
ZINC:	**Virgin, 98%**	£70 2s 0d	8.77¢
ALUMINUM:	**Ingot, 99.5%**	£161 0s 0d	20.125¢
ANTIMONY:	**Regulus, 99.6%**	£237 10s 0d	29.69¢
TIN:	**Standard, 99.75%**	£700 0s 0d	87.50¢
TUNGSTEN:	**Long ton unit, 30Ss, equivalent to**		$42.70

1. With Sterling pound at $2.80.

Quotations on metals and certain ores through the courtesy of *American Metal Market*, New York, N.Y.

PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill, or smelter. This PEP section is MINING WORLD'S way of making available to you some of the finest current information on mechanization.

Here's a Geiger for Use In Planes, Autos, or Afoot

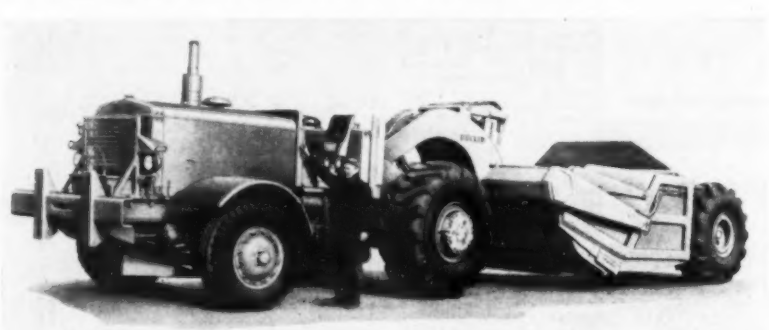
The Radiac Company's new Prospectoscope weighs only 14 pounds but is 30

times as gamma-sensitive as a standard Geiger tube. It is fitted with a meter, which has five ranges of sensitivity; it also has a speaker to give an audio indication of a radioactive find; and in places where noise interference is excessive, earphones can be used. For more information on this new uranium finder, circle no. 65.

One-Application Paint Seals Masonry Surface

A new oil base paint, known as Damp-Seal and made by the Monroe Company, is said to resist moisture on interior and exterior masonry surfaces for years with a single application. It contains a grit-like volcanic ash filler which fills up small pores and stops capillary action. It waterproofs without peeling, chipping, blistering or cracking.

Damp-Seal requires no sizing, is available in seven attractive colors, and can be applied over unpainted or previously painted surfaces, wet or dry. For further information, circle no. 69.



Euclid Introduces New "Lever Action" Scrapers

A complete line of improved scrapers is announced by the Euclid Road Machinery Co. In addition to its standard 15.5 cubic yard scraper and 18 yard twin-power unit, Euclid is building a new 12 yard model.

All three models feature the introduction of a "lever action" design used in connection with an improved and simplified hydraulic system.

Levers replace cables and sheaves formerly used to multiply the stroke of hydraulic jacks actuating the bowl lift, apron lift and roll-out ejector. The jacks for the bowl lift and apron lift are mounted vertically and have been incorporated in the torque tube. This, together with the lever arrangement, lowers the height of the scraper nearly two feet, providing a clean appearance and making it easier to top load with shovels and draglines. Approximately 90 feet of control cable is eliminated.

Jacks are controlled by an improved and simplified hydraulic system. Various components of the system have been grouped together in a hydraulic package placed on the front of the tractor. Two lever action hoists raise the bowl to a maximum height of 28 inches. The apron is lifted by a hoist and lever connected to the apron by 11 feet of cable. This is the only cable used on the scraper. Both the apron and ejector can be operated together for high speed spreading.

The lever principle is also used to operate the roll-out ejector. The lever has a roller acting against the ejector which rapidly pushes it forward. Near the end of the stroke the roller rides over a cam surface which accelerates the action, producing the necessary "snap" to dump sticky materials.

All four jacks of the scraper are identical in construction and are fully interchangeable with each other. They are single stage hoists.

The 12 and 15.5 cubic yard scrapers are identical in construction except for capacities, engine sizes and the number of forward speeds. The 15.5 yard scraper formerly was offered only with a 275 h.p. Cummins engine. The new model will be supplied with either a Cummins or General Motors 275 h.p. engine. It has a 10 speed transmission. Struck capacity is 15.5 cu. yd. and heaped capacity 18 cu. yds. at a 3:1 slope and 21 cu. yds. at a 1:1 slope. Drive and scraper tires are 24:00 by 25. Circle 73.

Conveyor Carrier Designed For Easier Maintenance

A new Stephens-Adamson belt conveyor carrier series has been designed with spun end rolls and welded steel frame. A seamless steel tube houses the tapered roller bearing and is bored for precision alignment. Bearings, protected

by die cast labyrinth seals, can be adjusted for proper clearance by taking nuts which support the rolls in the carrier brackets; rolls can be lifted from the frame for inspection without tools. Roller assemblies and parts are interchangeable.

For a copy of bulletin 453 on these new carriers, circle no. 62.

Color Bulletin on the Versatile Tournatractor

LeTourneau-Westinghouse Company has a new 28-page booklet in color de-

scribing and picturing the Tournatractor, a high-speed, electric controlled, rubber-tired tractor that is one of mining's most versatile tools—ten interchangeable attachments are available.

Action shots and cut-out photos of integral parts of the machine illustrate how and why it gets more work done, cuts weather delays, reduces maintenance, speeds push-loading and saves time and money on the job-to-job moves. For your copy of the bulletin, circle no. 63.

PORTABLE AIR SUPPLY: The O. K. Clutch and Machinery Company has developed a new small portable compressor that can be towed behind a passenger car and that will handle a 45-pound rock drill. If you would like more information on this new Hornet "75", circle no. 1.

PAYLOADER—THE MINER'S HANDYMAN The big 1½-yd. model HM Payloader has proven itself a valuable and versatile earth mover in and around mines and mills. It can excavate, strip, load, backfill, bulldoze, spread, pull, push, lift and carry. A Payloader catalog describes this and smaller units. Circle no. 2.

DUST RECOVERY PROBLEM ANSWERED: Western Precipitation Corporation is the only organization with years of know-how in both electrical and mechanical methods of recovery. Get the full information on how this experience can be made readily available to answer any of your dust problems. Circle no. 3.

NARROW GAUGE DIESEL SWITCHER: Baldwin-Lima-Hamilton Corporation is building a new Diesel locomotive in gauges from 30 to 66 inches for plant switching service. The new unit weighs 25 tons, has a starting tractive effort of 17,500 pounds. Speeds are 10.6 and 28.0 miles per hour. No. 4.

THROWAWAY BIT SERVICE: The Throwaway Bit Company maintains a complete service department for the reference of potential Throwaway bit users who are interested in testing performance in their own mine or for instructing miners in the use of Throwaway bits. For further information, circle no. 5.

6-YARD CRAWLER-MOUNTED DRAGLINE: Harnischfeger's new dragline reportedly the biggest ever mounted on two crawlers, affords smooth, fast operation through Magnetorque controls. For full details, circle no. 6.

CLOSER MINING CONTROL: Farmers Engineering and Mfg. Company has designed a phone system specifically for underground mining operations where close control is essential for efficient production. Get the company's bulletin 25 on this new Femco development by circling no. 7.

NEED A NEW MILL OR PLANT? Or maybe you just need a few alterations to your existing set-up. If so, Stearns-Roger has the experience and know-how to satisfy the most exacting specifications on anything from a modern multi-million dollar plant to repairs and alterations on existing mills. Learn of Stearns-Roger construction and design services by circling no. 8.

ONE DRILL STEEL DOES THE WORK OF TWO: Timken multi-use and carbide insert bits fit the same drill steel. You can now change bits on the job as the ground conditions require. Lower inventories and higher drilling time per shift are only two of the advantages of Timken's system. Circle no. 9.

LOW COST CONCENTRATION: The Humphreys Sprial offers the maximum in flexible, efficient concentration with the lowest possible maintenance and repair—there are no moving parts. Humphrey's services include a complete testing laboratory. Get full details by circling no. 10.

HARD-FACING MANUAL: The Stoody Company has released a revised edition of its famous Hard-Facing Guide Book. It covers procedures for all types of heavy equipment; methods developed and used today by maintenance men all over the world. Circle no. 12.

HOT MATERIALS BELTING: Goodrich has developed a new type of conveyor belting for handling hot solids up to 500°F. The unique design includes a patented nylon cord breaker paired with a glass fabric belt carcass. Circle no. 13.

NEW PLACER GOLD TROMMEL: The Excelsior Products Company is putting into production a newly-invented, oscillating machine (shaped somewhat like a trommel) designed for the small placer operator in recovering gold from sand and gravel. Excelsior (11000 E. McNichols Rd., Detroit, Mich.) will accept placer samples for testing in the new machine. Circle no. 14.

LIGHTWEIGHT CHAMP: That's the name of the newest addition to the pumps made by the Carver Pump Company. It weighs only 55 pounds yet handles 100 gallons per minute. Complete with a 4-cycle, 2-hp gasoline engine, this little portable giant sells for only $125. For Carver's bulletin on this rig, circle no. 15.

FREE JIG TESTS: Denver Equipment Company is so confident that a Denver Mineral Jig will pay for itself in a short time in your mill and continue to make profits for you that they will make a laboratory jig test without charge. For full information, circle no. 16.

PHOSPHATE PLANT DESIGN: A new 6-page bulletin has been released by the Dorr Co. describing the processes, flowsheets, and systems developed by Dorr for triple superphosphate plants, ammonium phosphate plants, phosphoric acid plants and concentrated fertilizer plants. To obtain a copy, circle no. 17.

LEVER ACTION SCRAPER: Details of the new Euclid "lever action" scraper are presented in a 16 page catalog folder available from the Euclid Road Machinery Company. The design of this 15.5-yard scraper is said to eliminate all cable, with the exception of a short length used to open the apron, and incorporates a simplified hydraulic system having a heavy duty pump mounted internally in the supply tank. Circle no. 18.

CENTRIFUGAL PUMP BULLETIN: Allis-Chalmers has released a revised bulletin on their 66 sizes of single-stage, double-suction centrifugal pumps (Type S). In addition to data on construction features, the bulletin explains how to figure pumping head and tabulates friction loss for water per 100 feet of pipe. Circle no. 19.

EASILY-INSTALLED ROLLER CHAIN: An improved, easy-to-assemble riveted roller chain is now available through the Chain Belt Company. Basically, the chain combines the long-wearing characteristics of riveted roller chain and the ease of assembly and disassembly of cottered chain. For full details, circle no. 20.

CINNABAR AND Hg VAPOR DETECTOR: Harold Kruger Instruments has announced the new Kruger Mercury Vapor Meter that instantly detects the presence in the atmosphere of mercury vapor and may be used to just as quickly detect the presence of cinnabar in ores. Circle no. 21.

SAND PUMP BOOKLET: How the Denver Equipment Company's vertical centrifugal sand pump handles frothy pulps without dilution or continuous operating attention is described in the new Deco bulletin P10-B4. For your copy, circle no. 22.

ROPE LUBE DEFIES WATER: Proof of the protection offered by Sta-Put 580 grease for rope lubrication is the experience in a recent large Utah mine. 100,000 feet of rope was lubricated with this grease and, after two months of submersion in acid mine water (pH of 5), showed no signs of corrosion. For full information E. F. Houghton & Co.'s Sta-Put 580, circle no. 23.

Circle numbers and mail this card for free product literature

To get further information on any item described in the Production Equipment Preview, note the key number of that item, circle the corresponding number on the PEP card at the right, and mail. If mailed from a point outside the United States, proper postage must be used.

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JULY 1953 — NOT GOOD IF MAILED AFTER SEPTEMBER 25

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41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80

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FIELD-TESTED DIAMOND BITS: Smit diamond drilling bits are field tested for both design and performance by the Smit technical staff to insure the user will obtain the lowest drilling costs and highest salvage returns possible on all types of formations. For a catalog and performance specifications, circle no. 24.

MATERIALS HANDLING: "Mining is basically a problem in transportation." And wherever materials are handled, loading and unloading are two of the most important problems. A coordinated system of stacking loads for storing or transporting materials is detailed in a new bulletin published by Phillips Mine & Mill Supply Company. Get a copy of bulletin E-50 describing the complete system by circling no. 25.

CHAIN DRIVE GUIDEBOOK: "How to Select Standard Roller Chain Drives," a new guide to better practice published by the Baldwin-Duckworth division of Chain Belt Company, includes formulas, tables, and examples illustrating proper applications. Information includes sprocket sizes, uses, and prices as well as proper maintenance of chain drive systems. Circle no. 26.

VERSATILITY LOADING: A folder highlighting the mechanical features and specs of the Caterpillar HT4 shovel is just off the press. Typical jobs on the surface and underground where this versatile machine has been successfully applied are also pictured. Circle no. 27.

ALLOY RODS CATALOG: Alloy Rods Company, the largest manufacturer of stainless steel alloy arc welding electrodes, has just released a 20-page catalog in color on its complete line of Arcaloy stainless steel electrodes. Circle no. 28.

LIQUID DUST-CONTROLLER: The Johnson-March Corporation produces a liquid compound that effectively controls the dust produced in crushing plants and mines for as little as ½ cent a ton. For a copy of their complete brochure on the use of the new Compound M-200, circle no. 29.

PRE-FAB PLANT BUILDINGS: Armco Drainage & Metal Products, Inc. has a new 6-page brochure that tells how to cut mining costs and improve plant safety with the company's patented steel panel buildings. For your copy, circle no. 34.

ROCK MOVING, ALL KINDS: A 48-page Euclid catalog describes in detail the complete line of Euclid rock and earth moving equipment—from scrapers and loaders to the big, dependable Euclid rear-dump trucks. Circle no. 35.

CONVEYOR BELT REPAIRS: A plastic rubber compound made by the Magic Chemical Company is receiving wide use in the mining industry for the repair of expensive conveyor belts. A new brochure is now available that describes the cost-saving features of this Magi-Vulc method. Circle no. 36.

CRUSHER PROTECTOR: The Industrial Equipment Section of RCA Victor has designed a new electric metal detector for the prevention of damage to crushers and grinders by tramp iron. It can be rigged to activate any type of signal device or to stop the conveyor on which it is mounted. For further information, circle no. 37.

STOCKPILE LOADER: Complete descriptions, specifications, and pictures of the Athey model 3 Forced-Feed loader, the original conveyor-type windrow and stockpile loader, are now available in a new Athey booklet. For your copy write Athey Products Corporation, Dept. MW-4, 5631 W 65th St., Chicago 38, Illinois, or circle no. 38.

BASIC FLOTATION MANUAL: Hercules Powder Company's flotation agents —their uses and shipping specifications— are described in a new booklet that includes discussion of the basic principles of flotation. Circle no. 39.

CRAWLER TRACTOR BULLETIN: International TD-18A crawler tractors are being increasingly used where ruggedness and an ability to produce greater drawbar hp. while holding down work costs are required. I-H's new catalog, E-40-C, contains all pertinent data on these units. Circle no. 40.

NEW SULPHITE DEPRESSANT: Aero Depressant #675 is a new Cyanamid 600 series reagent that has sharply increased the recovery and grade of produced concentrates in the flotation of hitherto intractable lead-copper and lead-copper-zinc ores. For further information, circle no. 41.

CLASSIFIERS—BIGGER AND BETTER: Whether it's a little 12-inch model or one of the big 84-inch machines produced by the Western Machinery Company, every Wemco classifier offers the same advantages—greater overflow capacity, sharper separation, greater raking capacity, and balanced operation. For full details on these spiral classifiers, circle no. 42.

NEW HAUL BOOK: Euclid Road Machinery Company has published a new book, "Estimating Production and Costs of Material Movement with Euclids." It's designed to lower costs and increase production for users of off-highway hauling equipment. Circle no. 43.

CABLE TROUBLES FROM BUBBLES: Flotation froth on electric wires and cables can be a source of costly trouble. Not so, though, with Simplex-Anydrex cables. They're made with specially compounded neoprene jackets that are unusually resistant to oils and to chemicals of all types, both acids and alkaline. For information on this Simplex Wire & Cable Company product, circle no. 44.

DRAGLINE SUPERIORITY: Bucyrus-Erie's extensive research and development work on walking draglines has always aimed at perfecting machines which combine maximum long term output with minimum maintenance costs. As an example, the new Bucyrus-Erie four-way front end offers a strong, lightweight boom; swiveling boom point sheaves; twin drag ropes; and better balance. Circle no. 45.

TOUGHER MINING CABLES: Mining machine cables can't be made too tough. One break in a cheap cable costs more than any saving realized in price alone. That's why Anaconda Cables mean lower costs—they can take three times more abuse. For further info, circle no. 46.

PAYLOADERS: The Frank G. Hough Company has issued a new 16-page booklet on the many uses of the model HM Payloader. Design and performance specifications are included to make this catalog of permanent reference value to the Payloader user. Circle no. 30.

ROPE SLINGS: "Slings for industry" is the title of a new brochure by Macwhyte Company, wire rope manufacturers. This new folder, no. 5308, is packed with sling data, pictures of slings, and drawings of various sling types. Get a copy of this informative, compact folder by circling no. 31.

JIGGING INFO: Denver Equipment Company's bulletin on their selective mineral jig has examples of practice, complete with flowsheets, on recovery of chromite, tin, tantalum, and columbite; proper applications in gravity, flotation, cyanide, and many other combination circuits. Also included is a data sheet whereby the millman can get Denver's answers to his specific problems. Circle no. 32.

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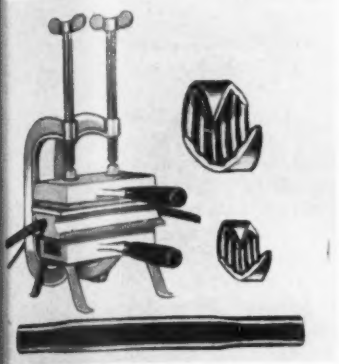
Quick-On Splice Proves Stronger than the Cable

Canton "Quick-On" electric cable splicers, a product of the American Mine Door Company, make spliced joints that have greater conductivity and are stronger than the cable itself.

In spooling or reeling, the Canton splicer will not permit wires to pry themselves apart or become lose-jointed to de-

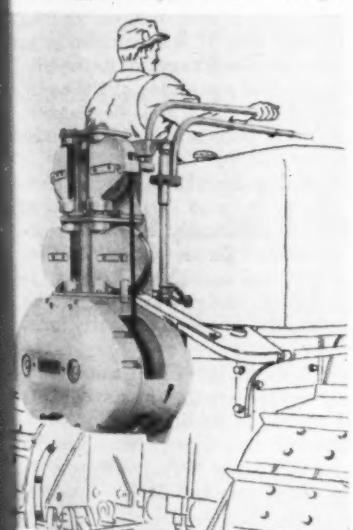


stroy the insulation. The "Wave-lock" design, with interior round ridges pressing the cable strands together, forms a solid mass with non-slip, non-slide waves embedded wire into wire. For further information on this method of making permanent hot vulcanized splices, circle no. 68.

Power Control Unit For Hi-Capacity, Easy Control

A new power control unit designed for high capacity and easier control with adequate line pull for even the most severe operating conditions, is offered by the Baker Manufacturing Company.

The new rear mounted Baker unit, the PCU-75, combines a multiple disc clutch with a rugged, simplified brake design.



The new clutch actuates within a shorter distance than other-type clutches, and can be engaged or disengaged with a lever travel of only five inches. Exhaustive field tests have proved all performance figures to be conservative. To get complete details on this unit, circle no. 70.

Aluminum Mine Car Offers Rust Resistance

A corrosion-resistant aluminum mine car, with a body weight of only 1614 pounds in contrast to a body weight of 4417 pounds for a similar car made of

steel, has been developed jointly by Enterprise Wheel & Car Corporation and Reynolds Metals Company.

In addition, the 6-ton car offers these great advantages: (1) self-cleaning for faster dumping, (2) resistance to wear and abrasion, (3) vibration absorption to resist splitting and tearing. Circle no. 67.

High Lift Loader For Bulk Materials

A high lift model of the Baker-Lull Shoveloader, designed for loading gondola cars, hoppers, and trucks with bulk materials, has been developed by the Baker-Lull Corporation.

Dumping heights to 14½ feet and load capacities as high as three tons suit the

high lift Shoveloader for versatile work in mine plants and yards. Four accessory tools are available to increase utilization of the unit. These tools include a snow bucket, a loose material bucket, a material bucket, and a crane hook tool. Circle no. 66.

Largest, Most Powerful Permanent Magnet Pulley

Stearns Magnetic, Inc., has built what is considered to be the largest, most powerful permanent magnetic pulley ever made. The dimensions read: diameter, 42 inches; crown face, 38 inches; belt width, 36 inches.

Made of Alnico V, the Stearns pulley is designed to process 10-inch lump size at a belt speed of 300 feet per minute with a capacity of 300 tons per hour. For information on Stearns permanent magnet pulleys, circle no. 61.

Notes From The Manufacturers

International Harvester Company will take over the sale, distribution and servicing of Bucyrus-Erie tractor equipment after Janury 1, 1954. International Harvester will take up B-E's capacity and resell to company distributors, and B-E will gradually withdraw from all production. Bucyrus-Erie's need for additional facilities to make other products prompted the move.

New chairman of the board of directors for Sprague & Henwood, Incorporated, drilling contractors and manufacturers, is *James A. Ross*. *Adrian E. Ross* was elected president and *William J. Schank* has been made senior vice president and general manager.

Francis B. Speaker has returned to Hewitt-Robins Incorporated, following his resignation as director of the mining requirements division of the Defense Materials Procurement Administration.

The *Quebec, North Shore and Labrador Railway* is re-equipping its entire line of ore cars with Timken roller bearings. The project is scheduled for completion in 1954 and will involve a total of 2,000 97-ton ore cars and 32,000 roller bearings.

Yuba Manufacturing Company recently constructed a 20,000-square-foot structural shop at Benecia, California. The new building will replace an old structure converted during World War II to production of 155-mm howitzers.

Norman Readman is new managing director of Consolidated Pneumatic Tool Company, Ltd., replacing *J. A. Owen*. Mr. Owen, who has been with the company for 50 years, will continue as a director and technical consultant.

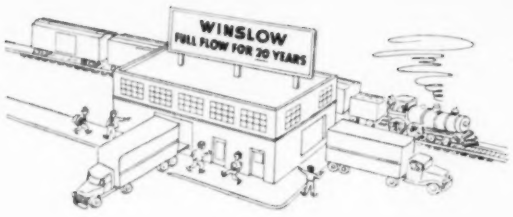
Jouett Shouse of Washington, D. C. has been elected board chairman of Anton Smit & Company, Inc., New York diamond firm. He will fill a position left vacant by the recent death of *Leonard J. A. Smit*, former chairman and principal stockholder of the firm.

Allis-Chalmers Manufacturing Company has reorganized its Denver, Salt Lake City, Phoenix, El Paso, and Spokane district and branch office territories into the Rocky Mountain region with headquarters in Denver. Richard D. Moody, manager of the Los Angeles district office since 1950, will head the new regional office. Richard L. Engel will succeed Mr. Moody in the Los Angeles office.

Following the retirement of *R. L. McLellan*, *Charles H. Thaw* has been advanced to assistant general manager of the export department of Worthington Corporation.

Robert H. Pearson, vice president of Gardner-Denver Company, has retired and moved to Denver to manage Air Rentals, Inc. The latter organization has been formed to distribute Gardner-Denver equipment and several allied lines of equipment and supplies for mining and construction. Mr. Pearson was associated with Gardner-Denver for 37 years.

The Harnischfeger Corporation has announced the appointment of *W. E. Hawkinson, Jr.* as sales manager of P&H's large excavator division. For the past two years, Mr. Hawkinson has been the corporation's district representative in Southeast Asia and the Pacific area.



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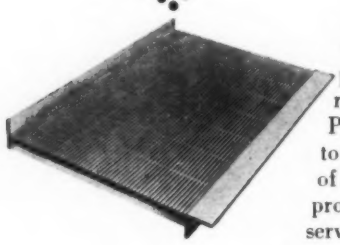

Hendrick Wedge-Slot Screens have very small openings yet have greater draining and screening capacity. They retain material that would ordinarily be wasted or cause expensive time delays for reprocessing.

Profile bars are shaped to maintain uniform width of slot openings as wear progresses. Long screen service life and constant ore quality are always maintained. Let us know your particular operating methods and we'll be glad to recommend the right Hendrick Wedge-Slot Screen for your specific needs.

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MUCKER TO EXECUTIVE - OUR U.S.A.

In preparing these articles we do not use second-hand news-casts, but in dealing with Communism we quote official translations of Communist state documents.

"*The Ultimate Aim of the Communist International—World Communism.*" Thus by their own statement Communism in Russia, Korea, and the U.S.A., or in an American union is one and the same thing. According to the latest list, our casualties in Korea are now over 135,000. By Russia, this is rated as Communist discipline applied to opposition.

The fixed determination of Stalin was stated September 9, 1927—"Thus, in the further progress of development of the international revolution, two world centers will be formed: the socialist center, attracting to itself all the countries gravitating toward socialism, and the capitalist center attracting all the countries gravitating toward capitalism. The fight between these two centers for the conquest of world economy will decide the fate of capitalism and communism throughout the whole world, for the final defeat of world capitalism means the victory of socialism in the arena of world economy."

In the above we have an open declaration of war, and war is war regardless of the level on which it is fought. However, the Soviets are not satisfied with the above, for they carry it into our internal affairs. Again we quote —"Being the land of the dictatorship of the proletariat and of socialist construction, the land of great working class achievements, of the union of the workers with the peasants and of a new culture marching under the banner of Marxism—the U.S.S.R. inevitably becomes the base of the world movement of all oppressed classes, the center of international revolution, the greatest factor in world history. *In the U.S.S.R., the world proletariat for the first time acquires a country that is really its own.*"

Advocates of Communism have the effrontery to talk about liberty of action in the Communist Party. Their dupes are soon due for a sad awakening. On the matter of party discipline we quote from Lenin himself—"During the present epoch of intense civil warfare, the Communist Party can accomplish its task only on condition that it is highly centralized, that it is dominated by an iron discipline which is quasi-military in its severity, that it is guided by a group of comrades at the center, enjoying the confidence of the rank and file members, endowed with authority, and possessing wide executive powers.

"He who weakens, no matter how little, the iron discipline of the Party of the proletariat (especially during the period of dictatorship) effectually helps the bourgeoisie against the proletariat." To know that this mention of discipline is no figure of speech we have only to remember how quickly Earl Browder was brought to his knees even though he was the head of the party in the United States.

President Wilson gave his estimate of the miner when he wrote.—"To the miner let me say that he stands where the farmer does; the work of the world waits for him. If he slacks or fails, armies and statesmen are helpless. He is enlisted in the great service army." If there is any stoppage of mining output all of our industry would soon grind to a stop.

In these turbulent days, it is necessary for all of us from mucker to executive to have but one aim—*Only Our U.S.A.* first, last and all the time.

"The Wanderer"

MAKE WATER RUN UPHILL with ANHYDREX CABLES

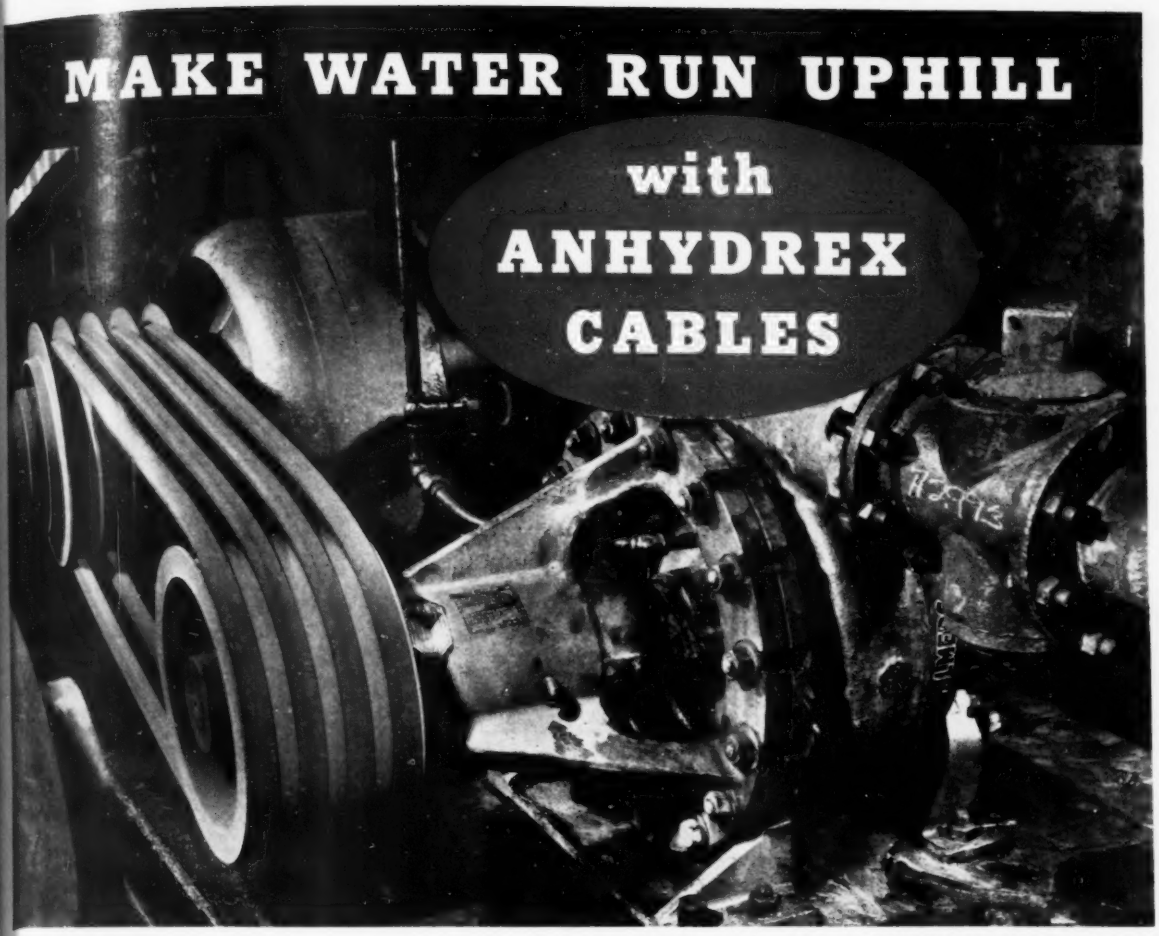

Photo courtesy ALLIS CHALMERS MFG. CO

Getting rid of unwanted mine water is not something that can be put off until tomorrow. Frequently it must be done today — or else.

Continuous operations, such as pumping, should not be left to haphazard selection of "just any kind of cable." For service as important as this, only the highest grade cable should be installed. Penny-pinching is definitely not economy. All it does is increase your cost of operation.

Ask yourself how much it would cost if a cable failed and put a pump out of operation. When you think that way it should be obvious that ANHYDREX is the cable you should buy and install.

The conductors of Simplex-ANHYDREX Cables are insulated with a low water-absorptive rubber insulation. They are protected by a generous wall of a special neoprene jacket. That is a combination that can't be beat.

The next time you need a cable for pumping service, regardless of the difficulties involved, install a Simplex-ANHYDREX Cable. It will pay you large dividends in peace of mind and in long-time operation.

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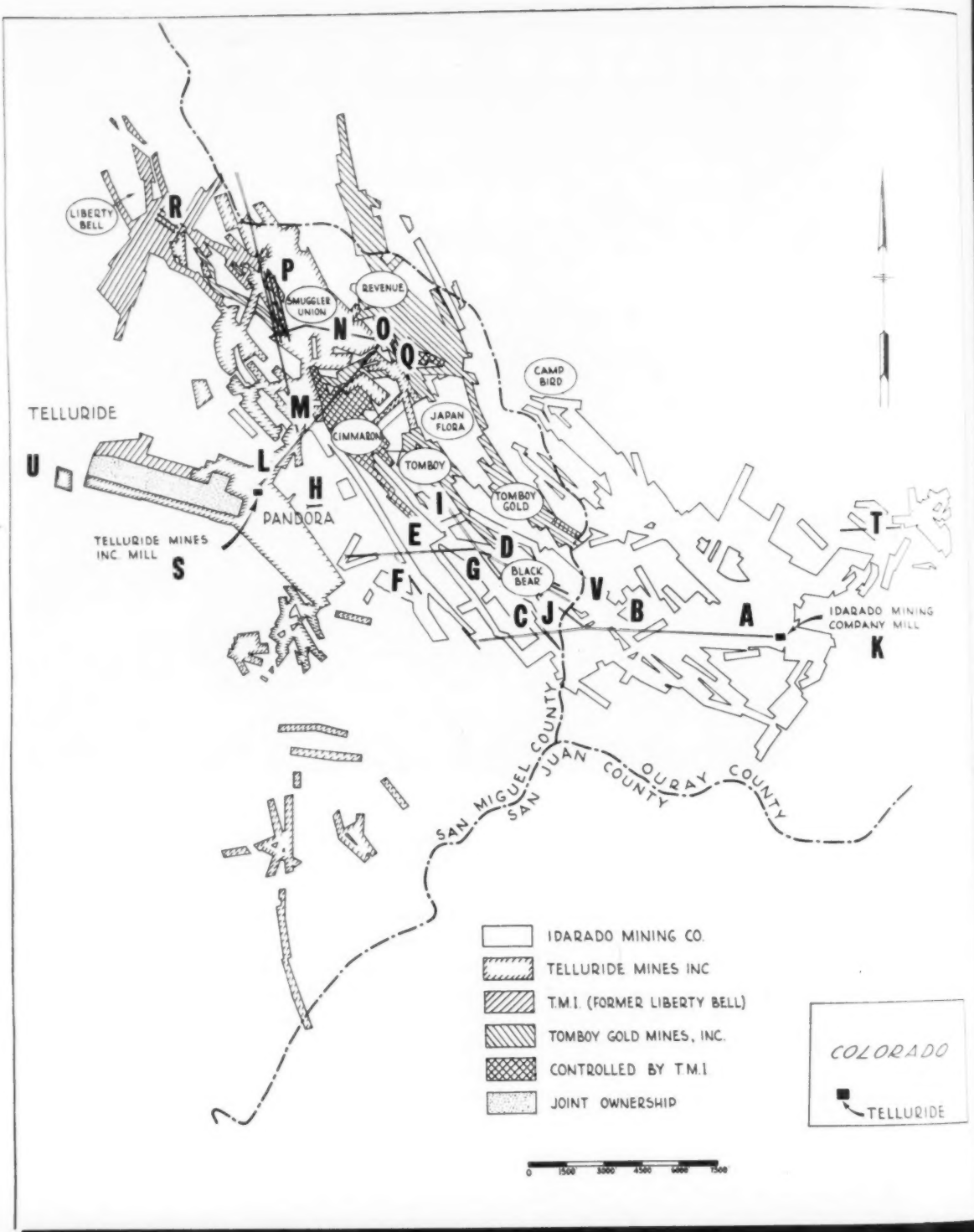

IDARADO-TELLURIDE

Claim and Mine Consolidation

San Juan Mountains, Colorado

precipitates—ROCKY MOUNTAIN

IDARADO CONSOLIDATES FAMOUS MINES IN COLORADO'S SAN JUAN DISTRICTS

By purchasing control of Telluride Mines, Inc. the Idarado Mining Company gains control of one of the nation's most highly mineralized districts, Idarado increased its milling capacity, acquired valuable mine workings which will permit deep development of the Black Bear and other Idarado mines, and made it possible to assure detailed planning and sequential mining of the many veins in the districts. Most importantly, unification of management and operations will lower costs and increase ore reserves.

In the area the ore deposits are chiefly veins in strongly fissured volcanic rocks, but the Smuggler Union vein (Telluride Mines) also contains mill-grade base metal ores in the underlying Paleozoic sedimentary formations. Quartz veins, often following the walls of dikes, contain galena, sphalerite, chalcopyrite, pyrite, free gold, tetrahedrite, and tennantite. They are noted for the continuity of ore, both along the strike and in depth. The Smuggler-Union vein has been stoped continuously over a strike length of 10,000 feet and through a vertical distance in excess of 3,000 feet. On and above the Pennsylvania Tunnel level, the Montana vein has been stoped over lengths of 4,000 and 6,000 feet respectively. Average vein width is about six feet, but the Black Bear vein (Idarado) has been mined over 20-foot widths.

Mining in the area has been underway almost continuously since 1875. The total value of gold, silver, lead, zinc, and copper mined at the Idarado-controlled properties approaches $175,000,000.

The most important features of this consolidation, together with important mine openings keyed to the map on the adjoining page by number, follows:

A. . . Treasury Tunnel, the main transportation level of the Idarado. Elevation 10,620 feet. Was 5,538 feet long initially to cut Handicap vein.

B. . . Treasury Extension to cut Black Bear vein and drift northwest along it. Started in July, 1943 by Sunshine Mining Company as Metals Reserve Company agent. June 30, 1944 Idarado repaid MRC for extension.

C. . . Treasury Extension to Ajax vein (believed to be southerly extension of Smuggler Union vein) driven 2,800 feet after World War II by Idarado.

D. . . Black Bear mine workings of Idarado. Originally developed from Telluride (west) side of range through crosscut 1,100 feet above Treasury level. Treasury extension (2. . .) disclosed good grade ore below original workings.

E. . . Meldrum Tunnel west portal. Elevation 9,971 feet. Acquired by Idarado and works started in 1949. First muck rammed on December 31. Tunnel has been extended to Argentine vein.

F. . . Ajax vein workings on Meldrum Tunnel level.

G. . . Raise driven 700 feet from Meldrum to connect with Treasury Tunnel workings.

H. . . Bob Cat Tunnel started in 1952 by Idarado to cut veins below Meldrum Tunnel level.

I. . . In 1952 ore was cut in the Tom Boy vein on the Treasury Tunnel level by Idarado, in Atlas Mining Company ground. Atlas: (75 percent Idarado and 25 percent Homestake Mining Company).

J. . . Idarado's underground primary crushing plant with a capacity of 100 tons per hour. Built in 1949.

K. . . Idarado's differential flotation mill treated 259,543 tons of ore in 1952.

L. . . Telluride Mines, Inc.'s 12,000-foot-long Mill Level Tunnel (cross cut to Montana vein. Elevation 9,100 feet.)

M. . . Pennsylvania Tunnel level of Telluride Mines. Main Smuggler Union level. Elevation 10,220 feet.

N. . . Montana crosscut from Pennsylvania Tunnel to Montana vein. Driven by Telluride Mines to develop Montana vein.

O. . . Orepass and service raise 1,200 feet from Mill level to Pennsylvania level driven by Telluride Mines. Muck is dropped through ore pass and men and supplies hoisted to upper workings through service raise. Mill Tunnel and raises have reduced Telluride's mining costs $1.50 per ton.

P. . . O'd Smuggler Union mine workings.

Q. . . Montana vein workings of Telluride Mines. Source of most of ore in recent years.

R. . . Old Liberty Bell mine workings.

S. . . Telluride Mines flotation mill. Recently enlarged to 900 tons per day. In 1952 recovered 3,390 tons of lead, 4,483 tons of zinc, 219,466 ounces of silver and 17,600 ounces of gold.

T. . . East Meldrum Tunnel. Originally planned to connect with Meldrum workings on west side of mountain range.

U. . . Lowest spot on the map 8,950 feet above sea level.

V. . . Highest spot on the map 13,495 feet. County boundary lines follow tops of high, serriated mountain ranges. Veins can be easily developed by crosscut tunnels from mountain slopes on both sides of ranges. Telluride side affords tunnel sites at lower elevations to make it possible to develop veins at greater depths from out crops than is possible on the Treasury Tunnel side of range.

The area shown in the map on the opposite page is approximately 66 square miles. The various mining company holdings are those for patented mining claims only. Locations of the many unpatented claims are not shown. Because of the large map area it is impossible to accurately show the locations of many underground mine workings which are as narrow as five feet. The schematic presentation is intended to show the scope of the Idarado and Telluride operations and to indicate the future importance to Idarado of the Telluride Mines by affording an opportunity for deep-level development of the Black Bear and Argentine veins from established Telluride mine openings.

Resurrection To Suspend Colorado Mine Operations

The Resurrection Mining Company has curtailed its lead-zinc-gold-silver mining operations at Leadville, Colorado and laid off 100 miners. The company will carry out a long planned development program, stope the ore body in the White Caps 407 No. 8 area, encourage lessees in certain mine areas, and continue to purchase custom ore and operate its 600-ton-per-day differential flotation mill at reduced capacity, according to Barney B. Greenlee, general manager.

Resurrection is one-third equally owned by the Newmont Mining Corporation, Hecla Mining Company, and the United States Smelting Mining and Refining Company, and was formed to operate a consolidation of famous old Leadville mines. At the present time the company is the largest claim owner in the district and owns the Yak tunnel, Resurrection, and other mines. Last year the company secured a lease and option on the famous Little Johnny and other gold mines of the Ibex Mining Company. In 1952 Resurrection was Colorado's largest lead mine, second largest zinc producer, and ranked third for gold and silver.

Reason for the curtailment is the mining out of the largest ore bodies. Resurrection No. 2 mine will be turned over to lessees as will the Ibex mines. Development and exploration will center in the White Caps area where 1,000 feet of drifting and several hundreds of feet of raising will be done from the 800 level to develop ore below the 400 level. The White Cap 401 inclined winze will be deepened 1,200 to 2,000 feet, followed by 3,000 to 5,000 feet of cross cutting and drifting from the bottom together with several thousands of feet of diamond drilling.

Resurrection's extensive geological, geophysical, and diamond drilling program has failed to find any ore in either Evans or Iowa gulches, according to Greenlee.

S. F. Chemical Expands Rocky Mountain Projects

San Francisco Chemical Company is planning extensive development and exploration work at its phosphate properties in Utah, Idaho, and Wyoming, according to D. L. King, general manager. Production will be raised from 300,000 to 500,000 tons per year at an initial cost of $500,000 to make the company the biggest phosphate rock producer in the area.

A new underground mine will be brought into production in the Crawford Mountains near Randolph, Rich County, Utah; an underground mine will be developed to supplement present open-pit production at Leefe, Wyoming; and an underground mine will be opened on the

North Waterloo claims near Montpelier, Idaho to boost production from stripping operations recently resumed there. John S. Wright, formerly an engineer with Newmont Mining Corporation and Resurrection Mining Company at Leadville, Colorado, has been named mine engineer for the firm and will supervise underground developments in the three states.

The increased production will go to Western Phosphates, Inc. to make triple superphosphate, to the west coast for the manufacture of single superphosphate, and to the Midwest to be applied directly to the soil.

The *Wellington* lead-zinc mine at Breckenridge, Colorado may cease operations within the very near future, according to W. L. Davenport, lessee. In this case, as in other recent lead-zinc shutdowns, low metal prices and high operating costs have made it impossible to operate at a profit. Wellington production has been doubled since last year and now exceeds 1,000 tons per month. Mr. Davenport said there is a possibility of keeping the mine open even though it would be barely breaking even, providing that metal prices drop no further and that no other conditions change.

Golden Cycle Corporation, gold producer at Cripple Creek, Colorado, has been granted a lease by the U.S. Atomic Energy Commission to mine uranium near Uravan, Montrose County. Preliminary diamond drilling and exploration was carried out by the AEC, and sinking of a 600-foot underground shaft has been started. Ore will be shipped to the AEC purchasing depot at Uravan. An initial investment of approximately $150,000 will be required to bring the mine into production.

Harvey W. Jacobson of Seattle, Washington has submitted a bid to the commissioners of La Plata County, Colorado for 13 mine claims in the Needham district north of Durango. Board chairman Lloyd F. Benton said the assessor's records would have to be checked and Mr. Jacobsen given an opportunity to meet a higher bid before any final disposition of the lands could be made. The claims involved include the *Baby Grant*, *Black Monster*, *E. A. K. Lode*, *Emerald Lake* (four lodes), *Emerald Lake Mill Site*, *Lillie Lode*, *Maid of the Mist*, *Pekin*, *Treasury Vault*, *Red Rover*, *Sunnyside*, *Little Jim*, and *Valley View*.

Minerals Engineering Company of Grand Junction, Colorado has been granted a rapid tax write-off of $197,381 for expansion of tungsten refining facilities in Montana and Utah. Minerals Engineering is constructing a $225,000 tungsten ore concentrating [illegible] near Great Falls, Montana and a $250,000 [illegible] mining plant at Salt Lake City, Utah. The refinery will treat low-grade tungsten concentrates produced at the new mill and custom ore will be bought from other mines and plants within reasonable shipping distance. The Salt Lake City plant is under construction and will be brought into production by August 1, 1953. It is located near the industrial center on the property adjoining the *U.S.S. Milling Company*, which is rearranging its mill to receive crude ore and to deliver low-grade concentrates to the refinery. M. V. Shaw, former general superintendent of *United States Vanadium Company* property at Bishop, California, will be in charge of the operations at the new mill. Blair Burwell is Mineral Engineering president.

Mariposa Mining Company, which has mines at Ophir, Colorado, is installing a new drum filter at its leased mill near Placerville. When the installation is complete, lead-zinc ores will be treated on a 24-hour basis instead of the present eight.

While negotiations for the purchase of *Telluride Mines, Inc.* continue, *Idarado Mining Company* has announced the purchase of *Colorado Standard Lead-Zinc Mining Company* at Lake City, Colorado. Machinery and equipment are being moved out and employees have been told that there would be no further mining at the Henson Creek site until the spring of 1954. Idarado took over the

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Ute and *Ulay* properties approximately six months ago on an operating option. The mine has since been closed due to the drop in lead-zinc prices.

A new company interested in unusual types of radioactive ores has filed incorporation papers at Denver, and will have fully-paid authorized capital of $100,000. The firm, to be called *Rare Earth Mining Company*, will have headquarters at Placerville, Colorado and will search for ores containing thorium and the rare earths and complex uranium compositions. Plans are underway to lease properties in Gunnison County and to build research facilities and a pre-processing plant in the area. Plant output will be sold directly to a large eastern chemical company with which Rare Earth has already signed a contract. Interested parties wishing to have samples tested should contact the firm by mail. Robert I. Ludwig is company president.

Shenandoah Dives Mining Company, major lead-zinc producer with headquarters at Silverton, Colorado, was among the group who were refused DMEA loans for further exploration. The company had planned a 3,000-foot crosscut to and a 500-foot raise on the Letter G. vein of the mine, and will be forced to shut down operations permanently unless a reconsideration can be obtained. One effect of the shutdown was the rerouting of 10 cars of ore from the Shenandoah mill to the Resurrection mill in Leadville, Colorado, 300 miles away. The 270-ton shipment of base metal ore with gold and silver came from the *Lead Carbonate* mine of the *Bonita Mining and Development Company*.

UTAH

First steps have been taken by the directors of the newly formed *United Park City Mines Company* at Park City, Utah to consolidate operations and qualify the company to do business in the state of Utah. The new company was formed by the merger of *Silver King Coalition Mines Company* with *Park Utah Consolidated Mines Company*, and company officials hope to reopen the closed lead-zinc mines as soon as possible. Two committees, one on mining and one on business, have been appointed to study the consolidation of the properties and organization and to report back at the next directors' meeting. Transfer agents have been appointed and stockholders have been mailed forms for conversion of shares. John M. Wallace is president of the new firm.

Shipments of uranium ore from the *Mi Vida* mine of *Utex Exploration Company* at Moab, Utah have now reached 4,000 tons per month, as compared with 50 tons in December 1952 when the shaft to the ore body was completed. According to Charles Steen, Utex chief geologist, the company has shipped more than 11,000 tons of ore with a value of $350,000 from mine headings since mid-December. Drilling to date has blocked out an ore body 600 feet square with an average thickness of 14 feet. A drill hole 2,900 feet southeast of the shaft showed 12 feet of ore at a depth of 305 feet. Drilling on the boundary between Utex and *Little Beaver Mining Company* 3,000 feet south of the shaft showed the ore horizon to be 35 feet thick with 16 feet of ore. A third drill hole on the *Linda Mujer* claim 650 feet from the original discovery site revealed 25 feet of ore. A Diesel loader and truck are being used underground in the mine, with no sorting or waste dumping, according to president Dan O'Laurie. An incline is being driven on the adjacent Little Beaver property, of which Bob Barrett is general manager and W. T. Hudson president. Both are members of the five-man group which originally incorporated Utex. Ore was also discovered on a second adjacent property, *Big Indian Mines, Inc.* The discovery was made in a diamond core drill hole about 4,000 feet northwest of the Utex shaft, and further drilling is now underway. Mr. Steen also organized Big Indian Mines, and A. K. McGill is president.

Columbia Iron Mining Company, which is carrying out open-pit iron ore operations in the Iron Mountain and Desert Mound area of Iron County, Utah, recently awarded a new stripping contract to *Utah Construction Company* for removal of overburden in connection with routine pit development in the Iron Mountain area. Utah Construction has for some time been carrying out a similar service for Columbia at Desert Mound.

Exploration has been halted at the 600-foot level of the *Harrington-Hickory* mine near Milford, Beaver County, Utah by a heavy inflow of water. The U.S. Bureau of Mines, which settled the incompleted contract, reports that drifting and cross-cutting on the 500- and 600-foot levels showed some lead-zinc sulphide mineralization on the latter. Exploration was financed by a $125,240 Defense Minerals Exploration Administration loan.

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ROCKY MOUNTAIN PRECIPITATES

Despite a drastic drop in lead-zinc prices, *New Park Mining Company* of Keetley, Utah was able to report a net profit of $70,610.31 for the 1952 fiscal year. New Park is at present the only large producer still operating in the Park City, Utah area. The firm mined a total of 75,118 tons of ore during 1952, second largest production figure in the company's history. Of this, 17,198 ounces were gold, 350,281 ounces were silver, 946,071 pounds were copper, 7,246,508 pounds were lead, and 10,007,687 pounds were zinc. Exploration work was continued on three separate projects, of which 50 percent was paid by the Defense Minerals Exploration Administration. A crosscut was driven from the Pearl fissure on the Mayflower level, but no mineralized structures were developed. The second project is the extension of the Mayflower tunnel in the southwestern area. This project is still underway, and is proceeding on schedule, although the area that can be prospected has been limited by a large inflow of water under high pressure. Development at the Star tunnel developed such a large flow of water that work was abandoned. Company development work included completion of the station at the 1630 level and development on both the Mayflower and Pearl fissures, with a new geological structure called the No. 3 fissure encountered between the first two. During 1953 the company plans to continue drifting on this level and will install additional hoisting facilities for sinking operations. Exploration was expanded to include the *Flagstaff, Gold Queen, Park Galena,* and *Snake Creek* properties. In addition, New Park has 1,200 acres of state land under uranium leases, has invested in an oil venture, will quarry on lands containing building sandstone, and is experimenting with geochemical methods at the Gold Queen area.

The U. S. Geological Survey has placed on display several photogeologic maps of Utah areas at the Geological Survey Distribution Office, 504 Federal Building, Salt Lake City, Utah. Included are Clay Hills 14 and 16 in San Juan County and Mount Peale 8, 9 and 16 in San Juan, Montrose, and San Miguel Counties. A geologic map of the Summitville mining district of Colorado with no text is also on display in Denver.

Kennecott Copper Corporation reports the presence of a new "wonder metal," rhenium, at its Utah Copper pit and other western mines. According to researchers, use for the metal lies between tungsten and platinum, since it has a melting point of about 3,160° C. and a specific gravity of 21.04. Kennecott has produced the "salt" of the metal, potassium perrhenate, on a laboratory scale, and the metal has also been produced as a by-product from the roasting of molybdenum sulfide by the Miami Copper Company.

Utah state health department officials have issued a report containing a warning reminder to mine operators that individual approval must be obtained for operation of each underground Diesel unit. The ruling covers use of metal Diesel-powered trucks, tractors or locomotives. The report added: "Contrary to the belief of some users of Diesel engines, carbon monoxide concentrations in a Diesel exhaust cannot be lowered by passing the gas through a water scrubber or water conditioner."

SOUTH DAKOTA

Test runs have begun on a new laboratory-scale pilot plant to recover beryl from the pegmatites of South Dakota's Black Hills. The plant can treat 10 pounds of crude pegmatite per hour. S. M. Runke, acting supervisor of the Rapid City field office, U.S. Bureau of Mines, developed the procedure for flotation of beryl. Non-lithium beryllium pegmatite materials are ground to a desirable size for flotation, then deslimed with interfering fines and mica removed. This is followed by bulk flotation of the beryl and feldspar minerals, and the separation of beryl from feldspar. Although current research is primarily concerned with recovering a satisfactory beryl concentrate, it will also permit research on the separation of mica, feldspar, tanta-

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columbite and other minerals found in pegmatite. Engineers estimate that present hand-sorting methods result in a 70 to 80 percent loss.

Homestake Mining Company reports that production during the first quarter totalled 332,305 tons, as compared with 244,536 tons during the same quarter last year and 328,085 tons during the final quarter of 1952. The ore was valued at $4,538,436.91, of which $4,316,106.44 was in gold and $22,330.47 in silver. Average value per ton was $13.05, as compared with $14.55 during the same quarter last year. Production of 121,000 tons in March established a new all-time monthly record. Ore reserves have dropped slightly, but company officials expect development below the 5,000 level to compensate for the decline. Income sources have been diversified by investments with *Newmont Mining Corporation* in the *Idarado* and *Atlas Mining Companies* in Colorado, as well as in exploration for uranium in the northern section of the Black Hills.

WYOMING

Two maps showing a total of 67 airborne anomalies in Wyoming have been released by the United States Geological Survey. The maps cover the Devils Tower region in Crook County and the Pumpkin Butte region in Johnson and Campbell counties. Copies are available for reproduction at USGS offices in Casper and Laramie.

The Wyoming State Land Board has granted 31 applications to *Jenkins and Hand* of Casper, Wyoming for uranium exploration in southwestern Carbon County and 11 permits for titaniferrous magnetite operations in Albany County west of Iron Mountain to C. M. Gilmore of Salt Lake City, Utah.

The first batch of alumina produced from Wyoming anorthosite has left the kilns of the experimental plant at Laramie and is now being analyzed. If the U.S. Bureau of Mines experiment proves successful, use of imported bauxite to manufacture aluminum may be replaced by the plentiful aluminum silicate rock. The plant has a 700-ton-per-day full operating capacity, but will be kept on a test operation basis through June 30, 1954.

A new posting place for maps showing surface areas of high radio activity has been announced for Wyoming. Maps showing anomolies found by airborne detection instruments will be posted on the 15th of each month at the Douglas Sub-Office of the *U. S. Atomic Energy Commission*, 209 East Center Street, Douglas, Wyoming. Other posting localities in the Rocky Mountain area include: Denver Exploration Branch, AEC, Denver Federal Center, Denver; Hot Springs Sub-Office, AEC, Hot Springs, South Dakota; Bureau of Mines Offices, Rapid City, South Dakota; U. S. Geological Survey Office, Custer, South Dakota; Grand Junction Operations Office, AEC, Grand Junction, Colorado; Salt Lake Exploration Branch, AEC, Salt Lake City; Richfield Sub-Office, AEC, Richfield, Utah; U. S. Geological Survey, Worland, Wyoming; and U. S. Geological Survey Office, Casper, Wyoming.

Summary of Drilling Contracts in Force Under Supervision of Grand Junction Operations Office of the United States Atomic Energy Commission[1]

Contractor	*Area*	*Footage Minimum*	*Footage Maximum*	*Type of Drilling*
Joy Manufacturing Company, Michigan City, Indiana	Northern Chuska Mountains area of Arizona & New Mexico	45,000	90,000	Diamond core drilling
Jones Core Drilling Company, Inc., Dallas, Texas	White Canyon area of San Juan County, Utah	40,000	75,000	Diamond core drilling
Boyles Bros. Drilling Company Salt Lake City, Utah	San Rafael Swell area of Emery County, Utah	20,000	40,000	Diamond core drilling
Minerals Engineering Company, Grand Junction, Colorado	Southwest La Sal Mountains area of San Juan County, Utah	40,000	75,000	Diamond core drilling
Johnson & Youvan, Naturita, Colorado[2]	Montezuma Canyon area of San Juan County, Utah	40,000		Diamond core drilling
Oliver Bros., Norwood, Colorado	Carrizo Mountains area of Arizona and New Mexico	55,000		Dry hole, non-core percussion drilling
Minerals Engineering Company, Grand Junction, Colorado	Colorado Plateau area of Colorado, Utah, Arizona, and New Mexico	Rental of Equipment		Diamond core drilling

1. This drilling is of an exploratory nature to discover and outline ore deposits.
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Kennecott Churn Drills for Copper East of San Manuel

Kennecott Copper Corporation's exploration subsidiary—Bear Creek Mining Company—is carrying out a long-range geological and exploration program for copper mineralization in Pinal County, Arizona.

The area under investigation is east of the San Manuel Copper Company's large porphyry copper deposit and also east of the area where Mammoth St. Anthony Mining Company conducted vein mining of lead-zinc-vanadium-copper ores.

In the Bear Creek area no mineralized outcrops have been found, predication of favorable mineralization has been based on geological assumptions and most importantly on a map made by the United States Geological Survey which indicates a magnetic anomaly of the area under investigation somewhat similar to the magnetic anomaly the Survey found in the San Manuel ore body location.

Bear Creek exploration, initially, is by churn drilling to determine depth and extent of post ore covering over what is believed to be a favorable igneous rock.

This long-range program is under the supervision of Dr. James Boyd, Kennecott's exploration manager.

Banner Gets DMPA Copper Production Contract

A production contract has been signed by the Banner Mining Company of Tucson, Arizona, and the Defense Materials Procurement Agency. The contract calls for the production of 12,960,000 pounds of refined copper over a three-year period with the metal purchased by the government at a guaranteed price of 31 cents a pound, f.o.b. middle western markets. The government also has an option at the market price for all molybdenum produced. In addition, some tungsten is expected to be produced as a by-product.

Plans for a small concentrating plant are being drafted and construction will probably begin within the next two months. Production of copper concentrates is scheduled to begin May 1, 1954.

Under the contract DMPA will advance the company up to $473,665, repayable with interest over a period of four and one-half years. The company is obligated to spend a minimum of $90,000 of its own funds on the project.

The Banner company's properties which will be developed and improved include the Mineral Hill group and the Plumed Knight group in the Pima mining district, about 15 miles southwest of Tucson. The current contract, which has been under negotiation since last fall, is the result of an exploration contract between the company and Defense Minerals Exploration Administration. The Mineral Hill contract with DMEA has a total value of $126,789 with the government's participation amounting to $63,393, or 50 percent. This project was completed in the latter half of 1952.

The Mineral Hill was reopened to a depth of 700 feet, and the 500, 600, and 700 levels were made accessible. This work proved a considerable tonnage of milling grade ore containing copper, silver, and small amounts of molybdenum and tungsten. About 30 tons of ore were mined daily, the ore coming from development work.

A second DMEA contract granted the Banner Mining Company covered the Copper Glance and Copper Queen claims located at Twin Buttes, about seven miles south of the Mineral Hill, and had a total value of $135,789. This project, which included diamond drilling underground, will be completed shortly.

A. B. Bowman, general manager of the Banner company, stated that the signing of the contract will mean an increase in the number of persons to be employed at the mine. The company now employs 35 men.

The *Vanadium Corporation of America* is reported to have taken over seven *Mesa Verde* and 12 *Rainbow* claims from Johnnie Patrick and Paul Cooper near Heber, Arizona. Psilomelane manganese will be mined and shipped to Wendon, the government's purchase and stockpiling depot.

Sealed bids have been requested by the U.S. Atomic Energy Commission for furnishing of all specified labor, materials, and services needed to perform 85,000 feet of diamond drilling within the Northern Chuska Mountains area of Arizona and New Mexico.

KAISER'S NEW FLUORSPAR FLOTATION MILL IN OPERATION

Kaiser Aluminum & Chemical Corporation's new fluorspar flotation mill at Fallon, Nevada is in operation treating 110 to 115 tons of ore per day for recovery of 30 to 50 tons of concentrate. The ore comes from the firm's Baxter mine at Gabbs. Concentrate is shipped by rail to California for ultimate use at Kaiser's steel plant at Fontana. Kaiser mines and mills the ore but trucking from mine to mill is contracted to McCutchen Transportation Company of Huntington, California. In the overall view of the plant, above, the primary crusher is at the extreme right. Here, trucks unload the ore. It is carried by conveyor to the temporary storage bin (next in line) to await secondary crushing. After final crushing and grinding, the ore moves to the flotation section housed in the building in the center background. Final concentrate is kilned and stored in the two rail-loading bins at the left. Walt Johnson is mill superintendent.

SOUTHWEST PRECIPITATES

Erection of the 102-foot steel headframe at the *Iron King* mine of *Shattuck Denn Mining Company*, Homboldt, Arizona, has been completed and installation of a new 400-horsepower double-drum Nordberg hoist is underway. Drums have diameters of 8 feet with 6-foot faces, and 1¼-inch Leschen type G flattened strand rope will be used. The headframe and hoist were designed to handle Iron King production down to the 3,000-foot level, although a depth of 1,700 feet is planned for the current shaft already is below the 1,000-foot sinking program. The four-compartment level and is being concreted to that depth. By late 1953, sinking and concreting to the 1,700-foot level is expected to be completed. H. F. Mills is general manager.

The *Metate Asbestos Corporation* drifted into a large fault recently which cut off the ore zone. After consultations with Andy Shride of the United States Geological Survey it was decided to drive an exploration drift through the fault in an attempt to find the orebody. After drifting through 30 feet of faulted area, the drift came back into the ore zone, which shows promise of being a large deposit of high-grade chrysotile asbestos, with a large percentage of crude No. 1 and 2 fibre. The Arizona Asbestos Producers Association has been requesting for some time that a government geologist and engineer familiar with asbestos deposits be assigned to the area to work with Arizona producers. The incident above is considered by the association to be one good example of the benefit of such assistance.

The *Bob Martin* brucite mine, about three miles northwest of Oatman, Arizona, has been leased to the *United States Brucite Corporation* of Gabbs, Nevada. The new operators have contracted for a 200-foot crosscut adit and 300 feet of drifting on the brucite vein. Equipment being used in the first work now underway includes a new mucking machine, 315-foot Diesel compressor, and new rock drills. Joe Bednar, superintendent of U.S. Brucite, is directing the exploration program.

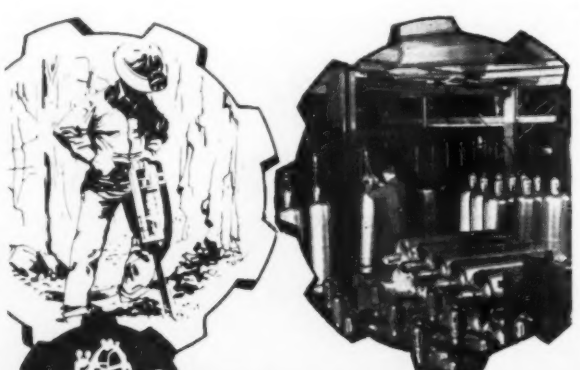
The *Volo Mining Company* is mining at the open-pit *Shaw* gold mine west of Placerville, California. A 300-ton mill will treat this ore and also copper ore from the *Noonday* mine in the same area which is now being dewatered.

The *Natomas Company* of Sacramento, California, reports a consolidated net loss of $41,121 for the first three months of 1953, compared with $13,627 in the first quarter of 1952. The company recovered $639,477 from gold dredging operations during these first three months of this year.

Geologists in the California State Division of Mines have located an extensive deposit of rock perlite in the Pinnacles National Monument, San Benito County, California which may prove to extend outside of the boundary of the Monument.

The *Hughes-Vertin Lime Company* of Auburn, California has undertaken a $100,000 expansion program. The installation of a 7 foot by 110 foot rotary lime kiln is nearing completion, with feed rock storage facilities for 3,000 tons. In conjunction with the present two operating rotary kilns, an increased tonnage hydrator and process plant, both bulk and bagged, will be installed. This will enable the company to supply all types of industrial and commercial lime. Herbert S. Dahlman, former assistant manager and chief engineer of the Fair lime plant at Paul Spur, Arizona, has moved to Auburn as chief engineer and co-owner of Hughes-Vertin.

Holman & Powell Paving Company of Los Angeles, California, is now producing about one railroad carload a week of chromite concentrate at its mill located 29 miles from Coalinga, California in Fresno County. The mill is equipped with two tables; proven capacity is 4



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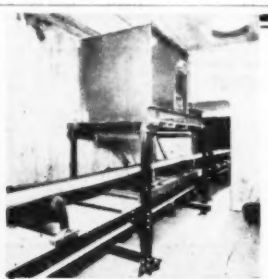

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SOUTHWEST PRECIPITATES

tons of ore daily and the table output is ¾ ton of concentrate per hour. The plant is currently on a 24-hour, six-day per week schedule. Ore comes from the *James-Thickstun* lease where mining is by open pit. During February, 120 tons of concentrates and 18 tons of high grade lump ore were shipped to the Grants Pass, Oregon, government purchase depot. J. R. Holman is manager of the operation.

Milling machinery has been installed on the property of *Buckman Mines, Inc.*, near Cloverdale, California, and about 1,000 feet of mining trackage has been laid. Six-car ore trains haul the mercury ore from operations 900 feet back in the mine tunnel out to the chutes where the ore is dumped into crushers and prepared for conveying to recovery furnaces.

The *Fowler Mining Corporation* reports discovery of a silver, lead, and zinc orebody at its property in the White Mountain district near the border of Esmeralda County, Nevada. About 25 feet long, a 12-foot vein is said to have been blocked out and limits have not yet been determined. Tunnel No. 3 is in about 200 feet and by all indications will go into the orebody in 40 to 60 feet, which will give a 100-foot-deep body of ore between the tunnels.

Shipments of iron ore from Nevada mines to Japanese mills may cease completely this month. Only one company, *Brussels Corporation*, is still shipping and its contract expires this month. A contract between the *Simplot Iron Mines, Inc.* and *Fuji Shoji Kaisha, Ltd.* recently expired. During 1952, almost 1,000,000 tons of iron ore went to Japan from Nevada operations. The decline is attributed to the availability of cheaper ore in British Columbia and the Far East.

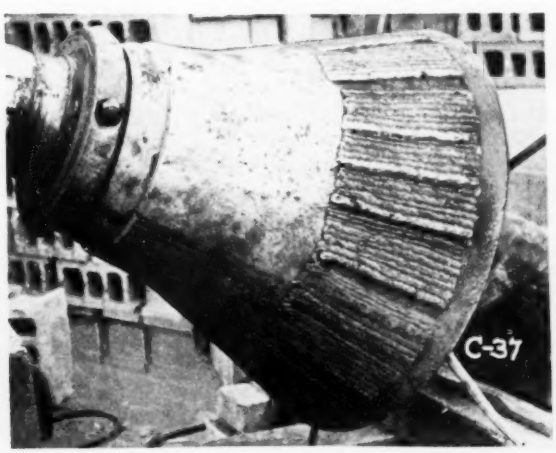
Alpine Mining Company has driven its haulage tunnel some 300 feet at the *Noonday* mine 55 miles southeast of Wells, Nevada, and a two-compartment vertical shaft has been sunk 110 feet. A station was cut on the 100-foot level, and a crosscut driven which should encounter two ore shoots when some 200 feet of work is done.

Sunshine Mining Company of Kellogg, Idaho has signed an agreement with Avery Brundage for an option on the *Mohawk* silver mine in Esmeralda County, Nevada. Purchase price has not yet been announced. Development work has started and plans call for construction of a mill when sufficient ore is blocked out. The property, located southwest of Silver Peak, was discovered 33 years ago by E. J. Shirley. In 1951, an option was given to E. R. Hines, who, in turn, assigned it to Mr. Brundage. H. Bradley Johnson of Sunshine's engineering staff at Kellogg has been named superintendent, and E. J. Shirley is mine foreman.

Mark Harris, consulting engineer of Fallon, Nevada, recently conducted a survey for the local Chamber of Commerce to help formulate plans for bettering the tungsten picture in the area. Tungsten producers in Churchill County were contacted about the status of their current work and future plans. Response was excellent and a complete portfolio of operational data has been compiled on the present status and problems of tungsten production.

Develpment work has started at the property of *Nevada Uranium Company* about 50 miles southwest of Winnemucca, Nevada, in Rocky Canyon. The firm has a DMEA contract to explore the four claims for uranium. Terms of the contract call for the deepening of a vertical winze from 62 feet to 100 feet below the adit level. From this new level, two crosscuts will be driven for a total of 125 feet. Easterly, a crosscut will be driven 35 to 50 feet; westerly, 56 to 80 feet. The vein will be cut in the process since the winze followed it part of the way down. Gus Rogers of Winnemucca is president of the firm.

Copper ore production at the *Morris* open-pit mine of *Consolidated Coppermines Corporation* in the Kimberley district of Nevada has been reduced to 10,000 tons per day because of backlogs of ore waiting to be concentrated at McGill. *Isbell Construction Company*, operating



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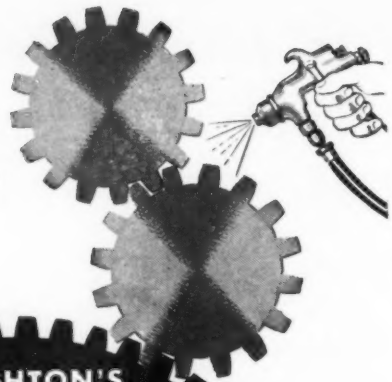

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the property under contra has had a daily output of as high as 5,000 tons per day. The pit is worked on a three-shift-per-day basis.

NEW MEXICO

Daniels and Glisson of Albuquerque, New Mexico were the successful bidders on a contract to remove about 100,000 cubic yards of material overlying the limestone formation which *Haystack Mountain Development Company* plans to mine for uranium ores near Prewitt, New Mexico. Contracts to remove additional overburden will be let as mining progresses. Haystack, a wholly-owned subsidiary of the *Atchison, Topeka and Santa Fe Railway* Company, is presently mining and delivering sandstone ores to the *Anaconda Copper Mining Company's* ore-buying station near Bluewater.

Kerr-McGee Oil Industries has asked the Navajo Indian advisory committee for leases which would warrant building a $3,500,000 uranium processing plant on the reservation. The proposed plant would process 73,000 tons of ore per year. The 2,500 acres now under lease for uranium work would not supply the plant for more than two or three years so the firm has also requested permission to explore the Chuska and Lukachukai Mountains north of Gallup, New Mexico for additional deposits.

Bruce Leek, former New Mexico Mine Inspector and a well-known mine operator in Grant County, New Mexico, has purchased the lease on the *National Defense* group of mining claims from Flor Torres and his associates. The property is located about 2½ miles northeast of Hillsboro, New Mexico. Ore produced is high-grade pyrolusite. The current ore body being mined is flat-lying and extends to the 75-foot level; its limits have not yet been determined. During World War II, the mine shipped about $8,000 worth of ore to the *Metals Reserve Company*. Mr. Leek will install a heavy-duty hoist, a 100-ton ore bin, and will repair the timbering and ladders of the shaft.

All production operations at the No. 1 shaft will be shut down from August 2 to August 9 at the *International Minerals & Chemical Company's* Carlsbad, New Mexico property while work on the hoist is completed. Included will be the installation of larger skips, enlargement and revision of the loading sump on the 900-foot level, doubling the power of the hoist, and reinforcing the headframe to safely handle the increased loads. Meanwhile, all that can be done without stopping the hoist is being done in advance of the shutdown. International's plant has been completed and will be in full operation this month.

The *U.S. Atomic Energy Commission's* office in Albuquerque, New Mexico has been selected as one of the places to display location maps of surface areas of high radioactivity that have been found by airborne detection instruments. This is part of the policy of the commission for releasing information that will aid in the search for uranium-bearing ores. The Albuquerque address is Professional Building, 142 NE Monroe St.

precipitates—CENTRAL and EASTERN

DMEA Reduces Number Of 'Critical' Minerals

The Defense Minerals Exploration Administration has cut in half its list of minerals for which assistance will be granted, limiting future exploration grants to those still in "critically short supply."

The government will contribute 90 percent of approved project costs for asbestos (amosite, chrysotile, and crocidolite), beryl, cobalt, columbium, tantalum, industrial diamonds (bort), mica (muscovite and block film), nickel, platinum, thorium, and uranium. In the case of manganese and tungsten, 75 percent of approved costs will be furnished. Fifty percent of cost will be met for refractory grade chromium, copper, molybdenum, and bauxite.

Secretary of the Interior Douglas McKay said that no government contracts would be granted to producers of materials not on the list, but that the 129 contracts now in effect would be completed. He also said an effort would be made to process 190 pending applications before the expiration of the DMEA program.

The cutback is expected to have serious effects on those portions of the industry not falling into the "critical" category, such as lead and zinc. In the Northwest alone, nearly $430,000 worth (70 percent) of recent applications were made ineligible.

Work on the *White Pine Copper Company's* project in the upper Michigan Peninsula is proceeding on schedule. The mine incline and portal have been completed, and underground work on the main service drift is under way. The ore will be stockpiled for the time being, since the mill and smelter are not expected to be completed for another two years. White Pine is a subsidiary of *Copper Range Company.*

Columbium (niobium) and titanium have been found in appreciable amounts in some of the rocks and minerals of Magnet Cove and Potash Sulphur Springs, Arkansas. A detailed geochemical study of the Magnet Cove rocks has been undertaken by the United States Geological Survey in order to understand better the source and geochemical environment of columbium and associated elements. The area is being remapped at an appropriate scale in order to gain further knowledge of the petrology, instrusive history, and structure of the ore-containing intrusive rock. Copies of the report are on display at certain Geological Survey offices.

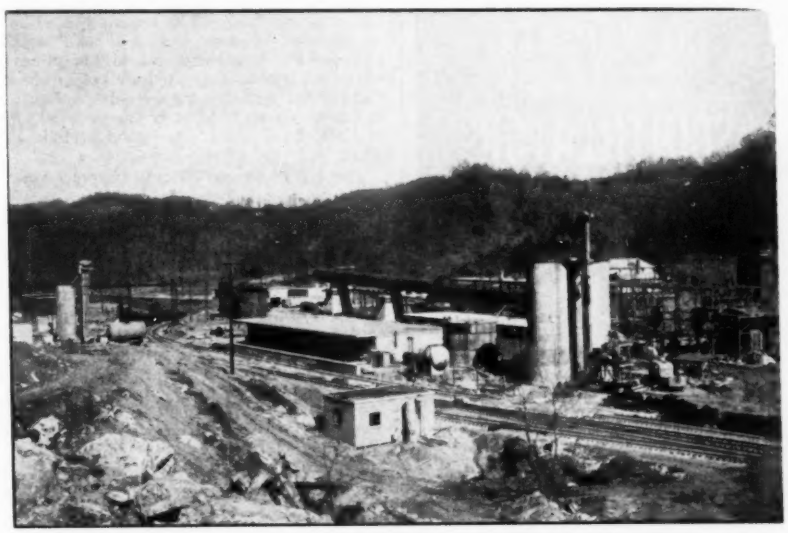
The Amarillo office of the U. S. Bureau of Mines reports Tri-State production of 432,688 short tons of crude ore milled at a recovery of 3.10 percent ZnS and 0.54 percent PbS for March. Zinc concentrate production amounted to 13,410 tons and 2,354 tons of lead concentrate at a combined value of $1,347,810.

A geologic index map of Minnesota has been issued by the United States Geological Survey. This is the 43rd in the series of state indexes which show the areas that have been geologically mapped in the U.S. The outline of each area covered by mapping and the approximate scale are shown by patterns in four colors. Bibliographies are printed with the indexes giving the sources and dates of publication and the names of the geologists responsible for the work.

Bartow, Florida has repealed its law against the mining of pebble phosphate in the city limits, and has adopted a new ordinance permitting mining under certain conditions. The action was taken as a result of a proposal by the *Independent Chemical Company* to give the city outright land which the firm owns and which the city needs for a prospective truck right-of-way. In exchange, the firm requested the right to mine for phosphate on other land which the company owns within the city limits, but only on a program approved by the city commission. Regular open-pit mining will now be permitted, provided the overburden (normally left in mounds around the pit) is levelled off by being used to fill in nearby low spots and put the area into condition for home or business use.

The *Hopwood Manganese Company*, owned by Frank Hopwood of Clay, Kentucky, is constructing a small but complete manganese ore dressing plant near Spring Mill, six miles north of Batesville, Arkansas. Also included in the project is construction of a railroad spur track and settling basin. The firm operates mining properties in the southern part of Izard County near Mount Pleasant. Besides the *Westmoreland Manganese Corporation* and the Hopwood company, there are at least seven other small mining companies in the Cushman area. These include the *McGee*, *McBride*, *Baxter*, *Sims*, *Parse*, *Utley*, and *Walker* operations.

The government will continue its program of stockpiling aluminum during the July-August-September quarter. The Office of Defense Mobilization's plans for a third round of aluminum expansion



FOOTE MINERAL CO.'S LITHIUM PLANT

Construction of Foote Mineral Company's large, modern lithium processing plant at Sunbright, Virginia, is making rapid progress and should be completed by the end of the year. In the picture above, the building framework for the plant may be seen at the right, with drying kilns and storage silos left of that. The new plant (being erected by Blaw-Knox Construction Company) will more than double the present U.S. capacity for lithium chemicals. The project is part of a $3,000,000 expansion program designed to meet the increased military and civilian demands. Facilities for quarrying and processing limestone will also be constructed at the Virginia installation, while at King Mountain, North Carolina, other mining, milling, and processing equipment will be added to triple the output of spodumene, the basic lithium ore.

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were somewhat shaken by the withdrawal of two companies from the program. *Olin Industries* and *The Wheland Company* of Chattanooga, Tennessee, both of which had certificates of necessity for new facilities, have cancelled their programs, thereby reducing annual output by about 200,000 tons of primary metal.

International Minerals & Chemical Corporation's new *Bonnie* plant in Florida has shipped its first carload of multiple superphosphate. It was destined for the fertilizer plant at Mason City, Iowa, operated by the Plant Food Division of International.

Development of methods for effective and economical recovery of uranium from low-grade ores and other low-grade uranium-bearing materials is being undertaken by a new U.S. Atomic Energy Laboratory at Winchester, Massachusetts, which is now in full operation. The *American Cyanamid Company* operates the new facility, having formed an Atomic Energy division which reports directly to the vice president of research and development. The laboratory was started at the Watertown Massachusetts Arsenal in 1945 under the direction of the *Massachusetts Institute of Technology* (MIT). When MIT could no longer continue the work, the contract was awarded to American Cyanamid in 1950. The operations continued at Watertown until December of 1952. The project is supervised by the director of *Stamford Research Laboratories* and close coordination exists between these two groups. Ore from all over the world is sent to this lab by the AEC for testing.

The government's mica buying depot at Spruce Pine, North Carolina is currently buying at a rate of $2,000,000 per year for the first time. The rate has steadily been increasing during the 35 weeks that the depot has been in operation, and it is expected that the regular rate will be $2,500,000 before the end of summer. These estimates have not included the possibility of a higher price for mica, nor do they include the probability that green mica may be bought in the near future. Most of the purchases to date have been for "good stained" mica.

The *U. S. Atomic Energy Commission* is conducting airborne radiometric surveys in the vicinity of Mauch Chunk, Pennsylvania to measure the amount and extent of radiation in the air as a clue to the extent of uranium mineralization in the ground below. Uranium mineralization has been known in the Mauch Chunk area since 1874, but was not studied until 1908 when it was identified as carnotite. Recently additional occurrences have been found but the extent and commercial importance are not known. These surveys will assist the Commission's Raw Materials Division in determining whether further exploration is warranted.

IRON RANGES

The second largest total for the month of April in the history of the Great Lakes ore fleet was reached this year when the fleet transported 8,403,842 tons of iron ore during that month. A new record for April might have been set had not ice blocked the Soo locks for several days early in the month. The total compares with 6,532,096 tons shipped in April 1952, and 8,868,286 tons when the record was set in April 1949.

The *Geneva* mine of the *Oliver Iron Mining Division* of the *U. S. Steel Corporation* is now on a six-day work week schedule, effective for the summer months at least. The only other mine on the range operating in this schedule is the *Montreal*.

Rhude and Fryberger have just completed the assembly of a 3-yard dragline which will go into operation immediately to speed up the stripping at the *Boeing* mine. This property, located at Hibbing, Minnesota, originally was an old underground mine, and was obtained under lease by Rhude and Fryberger last year. Previous shipments by the *Cleveland-Cliffs Iron Company* amounted to 2,711,000 tons. The last shipment was made in 1927.

The *W. S. Moore Company* has let a contract for the stripping of a section of the *Judson* mine just north of Highway 169, at Buhl, Minnesota. This new operation will extend the production of the present Judson crushing and screening plant. The Judson originally came into production during the 1951 shipping season.

The *M. A. Hanna Company* plans the installation of a Dutch States Mines HMS cyclone plant at its *Maroco property* on the Cuyuna Range near Crosby, Minnesota. This plant will handle approximately 60 long tons per hour of minus ¼ plus 65 mesh iron ore. It will supplement the present production of the Maroco HMS, crushing, screening, and washing plant.

Following a successful shipping season during 1952, the *Jessie Mining Company* has begun the construction of a washing plant to extend available shipping tonnages. The *Jessie* mine located near Grand Rapids, Minnesota on the Mesabi Range, began shipments during the 1951 ore season.

The *Proksch Construction Company* of Iron River, Michigan, has been awarded a contract by *Cleveland-Cliffs Iron Company* for construction of a new surface building and facilities at Republic, Wisconsin.

Sinking of the *Fogarty* mine shaft, operated by *Pickands Mather & Company* at Caspian, Michigan, to the 13th level is now in progress. The shaft is being sunk from the 12th level, or about 1,200 feet to the 13th where it will be opened for production.

Cleveland-Cliffs Iron Company has begun work on modernization of the *Cliffs Shaft* mine at Ishpeming, Michigan. Plans include the construction of an entire new head frame and shaft to replace the present dual shafts that have been in operation since 1880.

Construction of the taconite concentrating plant of the *Oliver Iron Mining Division* of the *U.S. Steel Corporation* at Mountain Iron, Minneosta has been completed, and test runs are under way. This plant is scheduled to produce 500,000 tons of concentrate per year. The fine concentrate will be shipped to the *Extaca* plant of Oliver at Virginia for agglomeration. Ore will be mined at the *Pilotac* mine at the rate of 2,000,000 tons per year.

precipitates—NORTHWEST

Idaho Mining Association Sets Golden Jubilee Plans

The Idaho Mining Association will celebrate its Golden Jubilee at its annual convention at Sun Valley, Idaho from July 13th through the 16th. An outstanding technical program has been arranged by association president Henry L. Day, president of Day Mines, Inc., Wallace, Idaho, and Harry W. Marsh, association secretary.

Featured government speaker will be Felix Edgar Wormser, assistant secretary, Department of the Interior in charge of mineral resources. This will be the first scheduled speech by the assistant secretary and the mining world will be much interested in his report on progress and plans of the Administration regarding minerals.

Donald K. McLaughlin, president, Homestake Mining Company, will give his views on "The Proper Uses of Gold," and the lead and zinc situations will be outlined by Robert Ziegfield, secretary, Lead Industries Association, and Ernest V. Gent, executive vice president, American Zinc Institute, respectively. The "Long Range Aspects of the Consumption of Silver, Lead, and Zinc" will be outlined by Simon D. Strauss, vice president of the American Smelting and Refining Company.

Other speakers will include Edward Woolzey, director, Bureau of Land Management, on "Mining Law Changes, If Any"; A. W. Fahrenwald, dean, University of Idaho, on "Some Current Beneficiation Problems"; and Joseph A. Mecia, Utah Construction Company, concerning his recent Korean tungsten experiences.

Entertainment will feature barbecues and banquets and all of Sun Valley's world-famous sporting facilities.

Polaris Will Undertake Longest Exploration Drift

A $675,000 below-sea-level exploration project is being undertaken by Polaris Mining Company in a largely unexplored area of the Coeur d'Alene mining region's silver belt south of Osburn, Idaho. The area lies between the company's Silver Summit mine and the old Galena mine (now the Vulcan and scene of a rich new silver strike recently), which is being operated under lease by American Smelting and Refining Company.

Contracts approved and authorized by Polaris stockholders recently would more than triple the Hecla Mining Company subsidiary's area of interest in the silver belt and extend its exploration rights to a total of nearly four miles along the belt.

The project includes the longest exploration drift yet attempted in the district. It would extend about 10,000 feet easterly from the face of a drift previously driven 550 feet into property of Merger Mines Corporation from the 3000-foot level of the Silver Summit mine. The drift would explore an additional 1000 feet of Merger ground, 7200 feet of Silver Standard Mining Company and American Silver Mining Company ground, and 1800 feet of Rainbow Mining and Milling Company ground.

A 330-foot raise would be made on the American Silver "wire silver" vein to connect with Coeur d'Alene Mines Corporation's 2800-foot level workings. Fifteen thousand feet of diamond drilling into walls of the drift and 1500 feet of crosscutting from the lateral also are planned.

Po'aris would pay all costs for 50 percent ownership interests in Merger, Rainbow, and Coeur d'Alene Mines, and 40 percent interests in American Silver and Silver Standard, which have been under development by Coeur d'Alene Mines Corporation. Couer d'Alene Consolidated and Callahan Consolidated mining companies also are involved in the multi-company deal.

Two other projects on the 3,000 level of the Silver Summit mine are exploring for mineralization. One crosscut is nearing the Chester end line of Polaris' subsidiary, the Chester Mining Company. The bore is paralleling the Chester vein structure which is probed by cross cutting diamond drilling at regular intervals. Two shoots of good commercial-grade silver ore have been opened by another crosscut into the New Purim area. The first shoot was 94 feet long; the second, 45 feet farther west, was 63 feet long. Minority ownership interests are held by Silver Dollar, Hayden Hill Consolidated, and Lincoln mining companies.

Shaft sinking plans of *Signal Mining Company* have been delayed in order to complete other development work on the present 200 level of the *Hilarity* mine on Pine Creek, Idaho. Present plans call for extension of the 200-level drift about 500 feet westerly to get under ore already exposed on the main tunnel level west of the main ore body. Originally, the firm had planned to sink from the 200 level to the 500 level, opening two new levels. DMEA financial assistance will be used in the west drift work.

Centrida Mines, Inc. of Kellogg, Idaho, has been incorporated with $750,000 capitalization. Incorporators are Wendell R. Brainard, P. J. Holz, and C. Whalen, all of Kellogg.

Idaho Diamond Drill and Contracting Company has undertaken extensive diamond drilling for *Inspiration Lead Mines, Inc.* at its property adjoining the *Dayrock* mine of *Day Mines, Inc.* north of Wallace, Idaho. Initial holes are in the mineralized area opened by the long northwest drift along the Black Cloud fault zone.

Early resumption of work is planned by *Clearwater Mines, Inc.* (formerly *Clearwater Gold and Copper Mining Co., Ltd.*) at its long-idle property in southeastern Shoshone County, Idaho. More than 2,000 feet of tunnel, shaft,

Silver Summit Mining Company's mine workings and deep shaft are the key to the new exploration program being undertaken by Polaris Mining Company. See details elsewhere on this page.

and raise work has been completed. The ore is copper, gold, and silver, with copper values predominating. Camp buildings will be rehabilitated, and the mine will be equipped with new, modern machinery. Leon G. Saboe, president and manager, will be in charge of all work on the property. George A. Purdy of Seattle is vice president and a director.

Golconda Lead Mines has laid off more than half its former 25-man crew to meet the pinch of low zinc-lead prices. Production at the *Golconda* mine east of Wallace, in the Coeur d'Alene mining region, Idaho, has been reduced to about 30 tons daily. Development work is continuing on a reduced scale. Old lower workings are being reopened under a DMEA contract. Wray Featherstone of Wallace is superintendent.

Day Mines, Inc. of Wallace, Idaho, is continuing several mine exploration projects despite a first quarter net loss before depletion and income taxes of $45,513, compared with a $268,935 profit a year ago. The firm has sharply curtailed its zinc output. Henry A. Day is president.

Lucky Friday Silver-Lead Mines of Wallace, Idaho, is deepening its new three-compartment offset winze in the *Lucky Friday* mine near Mullan at an average rate of about 4½ feet daily without mechanical mucking devices. The winze was 180 feet below the 2,000-foot level on May 26. Production of lead-silver-zinc ore was being maintained at about 75 tons daily. Dave Elder is mine superintendent.

The *Merry Blue* tungsten property near Stibnite, Idaho, has been purchased by *Alabama-California Gold Mines* from *R. A. Pfeffer & Associates,* Phoenix, Ariz., on a lease and bond basis. It was operated as a gold mine in the 1920's. The new owners are reopening a 200-foot tunnel with the object of getting into production of tungsten-gold ore. George O. Nelson of Seattle, is company secretary.

Whitedelf Mining and Development Company's mine crews near Clark Fork, in the Idaho panhandle, are making five feet a day in a drive from the mine's new 800-foot level to open downward extension of the main north ore body diamond drilled by the bureau of mines. At last report, objective was an estimated 900 feet ahead.

Blue Eagle Mining Company has levied an assessment of 3 mills a share to do assessment work on a surface showing exposed by bulldozing last year at its property adjoining the *Highland-Surprise Consolidated Mining Company's* operation in the Pine Creek zinc-lead district of the Coeur d'Alene mining region, Shoshone County, Idaho. C. Y. Garfer of Kellogg is president.

Sunshine Mining Company has resumed crosscutting northerly toward the *Silver Syndicate* vein from its 3,700-level workings in the silver belt west of Kellogg, Idaho. The firm's recently reopened antimony plant is running at virtual capacity.

Lucky Friday Extension Mining Company from its 2,000 level west drift into County, Idaho, would be explored by *Lucky Friday Silver-Lead Mines Company* from its 2,000 level west drift into leased *Gold Hunter Mining Company* ground under a proposed working agreement. Negotiations were reported by Charles E. Horning of Wallace, vice president of Lucky Friday Silver-Lead.

Lookout Mountain Mining and Milling Company's deep-level exploration crosscut at last report had been driven more than 1,300 feet southerly from the 1,200-foot level of the *Sunset Mineral, Inc.'s* mine shaft. The properties are in the Pine Creek district, Shoshone County, Idaho.

Highland-Surprise Consolidated Mining Company is crosscutting towards an ore zone from its new 1,050-foot shaft level while maintaining zinc-lead ore production at about 1,000 tons monthly from upper levels. Frank J. Luecke, Spokane, is president. The mine is in Pine Creek.

Ione Mining Company has resumed operations at its property east of Murray, Idaho after a winter shutdown. Plans call for making smelter shipments of high-grade lead-silver ore opened in a raise from the main adit last fall. Ole Nordquist is president and general manager.

Hansy Copper and Gold Mines has announced plans to resume work at its property near Adair, southeast of Wallace, Idaho. The lower tunnel, extended to the 1,200-foot point last year, would be advanced along the vein and raises started toward old upper workings.

At the *Hecla-Atlas* project near Mullan, Shoshone County, Idaho, a station has been cut at the 2,400 level. Sinking of a 95-foot sump and cutting of a skip pocket are under way. Diamond drilling

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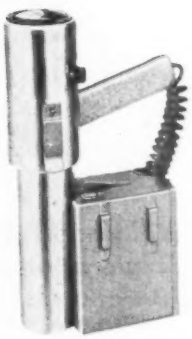

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is being done from the new station, preparatory to crosscutting to the Atlas vein system. *Hecla Mining Company, Newmont Mining Corporation* and *New Jersey Zinc Company* are conducting the work.

The *Sullivan* electrolytic zinc plant near Kellogg, Shoshone County, Idaho, is operating at capacity again. Early in April it cut production 25 percent because of a drop in deliveries of zinc concentrates from the Coeur d'Alene district. Needed concentrates were obtained outside the district. Wallace G. Woolf is superintendent.

Beacon Light Mining Company of Mullan, Idaho has been incorporated for $375,000 by Henry George, Edward B. Thompson, H. J. Clemons and Walter H. Hansen.

National Silver Lead Mining Company has levied a small assessment to finance reopening of the middle tunnel at its property on Big Creek in the Coeur d'Alenes of Idaho. Some diamond drilling also is planned.

Diamond drilling below the 200-foot level of the *Hilarity* mine in the Pine Creek district of the Coeur d'Alene mining region, Idaho, has disclosed ore values justifying a proposed $136,303 development program, officials of *Signal Mining Company* report. Next phase of the DMEA project will be to deepen the shaft and open new 350 and 500 levels.

Systematic development of the *Croesus* patented mining claim in the Willow Creek area of Camas County, Idaho, along with the nearby *Butter Cup* claim, is planned by the new owners, *J. R. Davies & Son*, mine operators and contractors of Gooding. They plan to continue treating Butter Cup dump material at their nearby mill and to sweeten the grade with ore from the Croesus mine. Concentrates would be shipped to the Midvale, Utah, smelter.

Idaho Metals Corporation is rehabilitating the *Werdenhoff* property in the Big Creek mining district of Valley and Idaho counties. Work includes reopening the Thunder Mountain adit. Values are in gold, silver, lead, zinc, and tungsten. C. W. Mason is president.

MONTANA

American Chrome Company plans to have its *Mouat* chrome mine near Nye, Stillwater County, Montana, in operation late this summer. Full-scale production of 1,000 tons daily will be reached by the year's end. The government is supplying $2,165,000 for mine-mill equipment. The company is financing $2,250,000 worth of housing, land buying, and working capital. The mine, operated by *Anaconda Copper Mining Company* for the government in World War II, is said to contain about 80 percent of the nation's known chrome ore reserves. A government contract calls for delivery of 900,000 tons of chrome concentrates in eight years. Estey A. Julian of San Francisco is company president.

The *Castle Lead & Zinc Company* of Lennep, Montana, plans to continue its crosscut adit into the old workings of the *Yellowstone* mine in the Castle Mountain district of Montana. Old records show that the mine produced lead, zinc, and silver ores. A lead vein was cut by the crosscut adit last summer but it proved to be noncommercial. The drift is expected to intersect the old shaft at about the 280-foot level.

Pat. T. Phalen, general manager of the *Western Mines Company*, has moved to Helmville, Montana where he will direct tungsten exploration work in the Ogden Mountain mining district of Powell County, Montana. Initial work consists of building an access road and then stripping the cover from old caved adits in the former *Hunter* property to expose scheelite-bearing veins.

Anaconda Aluminum Company has awarded a contract to the *J. A. McNeil Company* of Alhambra, California for excavation and concrete work on the plant to be built at Columbia Falls, Montana. The firm is currently building the new copper plant at Yerington, Nevada for *Anaconda Copper Mining Company*, the parent firm of Anaconda Aluminum. H. G. Saterthwaite will be superintendent of the aluminum plant and James F. Smith will be production superintendent.

Kimball Mines, Inc. is making a stock offering to raise funds to equip its gold-silver mine near Elliston in the Treasure Mountain district of Montana, and bring it into production. The vein system has been opened by surface bulldozing for more than 500 feet and by two lower tunnels. S. L. Stratton of Spokane, Washington, is president, and Thomas Towles of Spokane is secretary-treasurer.

Philipsburg Tungsten Company has been incorporated for $150,000. Directors are A. L. Applegate, W. L. Degenhart, John W. Cole, Ben Walkup, J. Chandice Ettien, B. G. Paige, and E. T. Irving, all of Philipsburg, Montana.

The tungsten mining situation in Montana is expected to improve with the proposed construction of a mill at Darby, Montana. This is expected to stimulate more prospecting for tungsten reserves. The success of the fluorspar property at Darby has also caused some activity in the same regarding prospecting for fluorspar. Some work on fluorspar properties is reported in the Sweetgrass Hills in Liberty and Toole counties. Some attention is also being given to a deposit located nine miles from Superior in Mineral County.

OREGON

The *Harvey Machine Company, Inc.* of Torrance, California has signed an agreement with the General Services Administration for construction of facilities at The Dalles, Oregon, with capacity to produce 54,000 short tons of primary aluminum annually. Harvey will construct a two-potline aluminum plant and an alumina plant with capacity to supply the reduction plant for full operation. Under the agreement, the government has an option to buy, at market price, the total output of the new facilities for five years. The government, in turn, agrees to buy at market price any metal offered to it by the company which the

company does not sell or use. The government must notify the company in advance of how much of the company's total output the government plans to buy.

Pacific Northwest Alloys Company is seeking a new lease on the $20,000,000 magnesium plant at Mead, Washington, which it operated for the government until a recent shutdown order. Before the plant was reactivated in 1951 for magnesium production, the company had been using several furnaces for the production of ferrosilicon and ferrochrome. H. B. Megill is executive vice president and general manager.

Jim Creek Mines, Inc., in undertaking lateral exploration of a 180-foot shaft sunk at its property northwest of Ione in Pend Oreille County's Metaline district, Washington. Operations were suspended during the spring run-off. Val Y. Preston of Spokane is president.

Germania Consolidated Mines, Inc., is seeking downward extension of a promising new tungsten ore showing uncovered by bulldozer at its Stevens County property. An estimated 200 feet of crosscutting will be needed. Mining and milling operations were resumed recently following a winter shutdown. Henry Franz of Lind, Washington, is managing director.

State chairman of the program committee for the forthcoming Seattle, Washington meeting of the Western Division of the American Mining Congress met in Seattle on June 17th under the chairmanship of Philip R. Bradley, president, Pacific Mining Company, San Francisco, California. Meeting dates were set as September 21, 22, and 23, 1953 with the meeting scheduled for the Olympic Hotel. Governmental and technical speakers for the program were selected, and an extensive entertainment schedule (which includes a Salmon Derby) was arranged.

The United States Geological Survey is considering a new mineral survey of the Colville Indian Reservation in Ferry and Stevens counties. Last survey was made 40 years ago.

Grandview Mines of Spokane has resumed winter-halted prospecting operations in northern Stevens County, Washington. George and Henry Rushmeier, veteran Smackout Valley prospectors, have been hired for the season. Karl W. Jasper of Spokane is president.

Pend Oreille Mines and Metals Company of Spokane, Washington is preparing its Metaline district (Pend Oreille County) mine for installation of a third trackless mining unit. Trackless equipment now in use has increased output per man-shift several times over the regular mining method. The mechanized units will be capable of producing about 2,000 tons of ore daily, it is estimated, with only 600 tons daily being produced by former methods. The state's largest zinc-lead producer boosted tonnage milled to 356,205 tons in 1952 from 273,580 in 1951. Stanley A. Easton, Kellogg, is chairman of the board, and Lewis P. Larsen, Spokane, is president.

Celestite-strontianite ($SrSO_4$-$SrSO_3$) ore is being mined on Fidalgo Island in Puget Sound by Dr. William E. Caldwell of Oregon State College and George Waterman of *Manufacturers Mineral Company*, Seattle, Washington. Ore is ground to 250 mesh. Initial 100-ton sale was to *Hooker Electro-chemical Company* of Tacoma for use in removing iron in manufacture of caustic soda.

Consolidated Mines and Smelting Co., Ltd., has moved its headquarters from Seattle to Keller in Ferry County, near the *Silver Ridge* group of mining claims which it is developing. Values are in gold, silver, copper, lead, zinc, and molybdenum. Hugh Brown is president.

Ashton Creek Mining Company of Bellingham, Washington has been incorporated for $20,000 by William E. Oldfield and Daphne Buchanan, both of Seattle, and Cameron Le Roy of Clipper.

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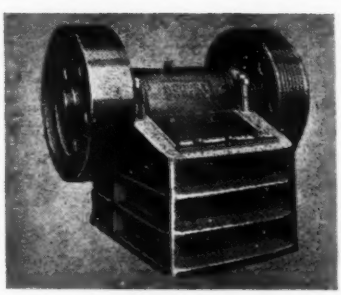

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1—230 CFM Gardner-Denver, 6" & 4¾" x 5"
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1—637 CFM Sullivan, 14" & 8¾" x 10"
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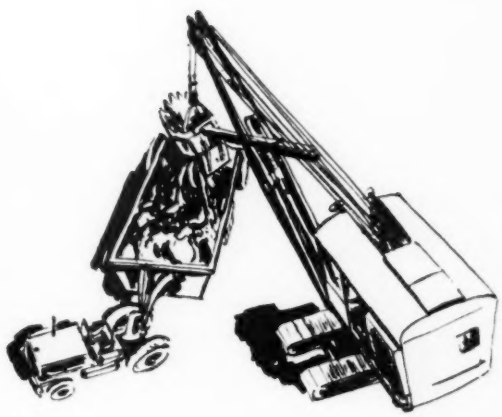

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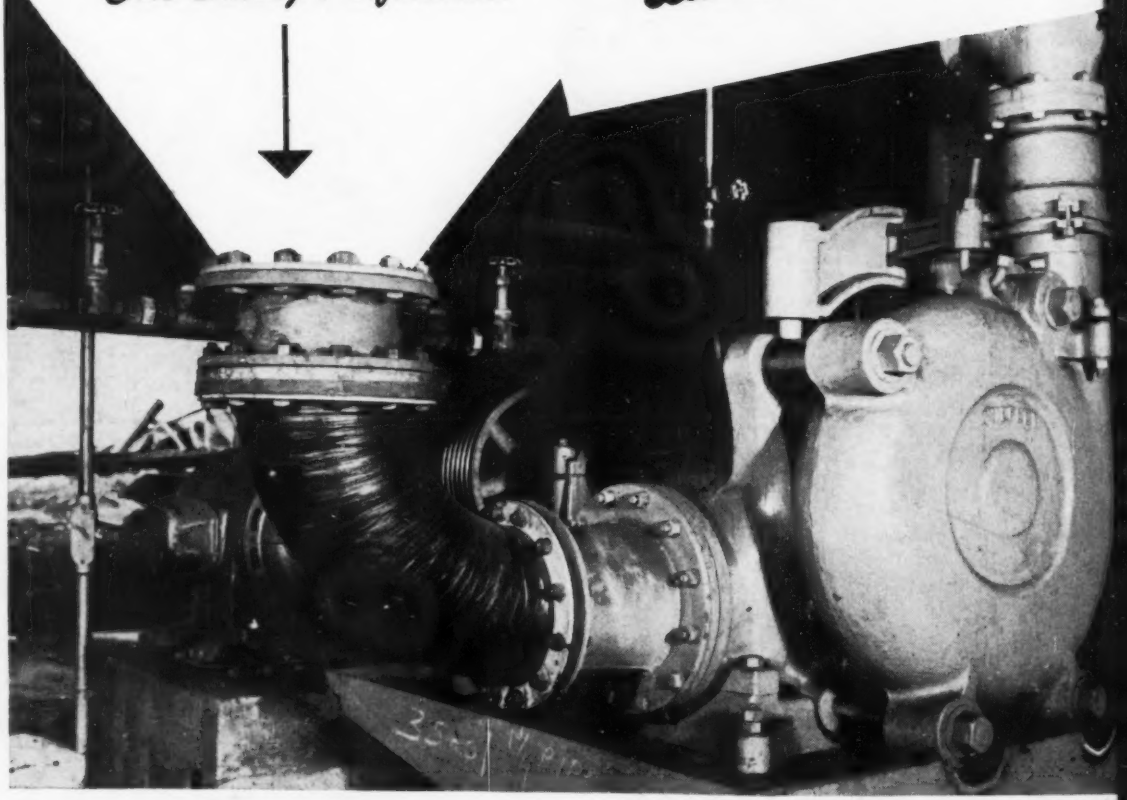

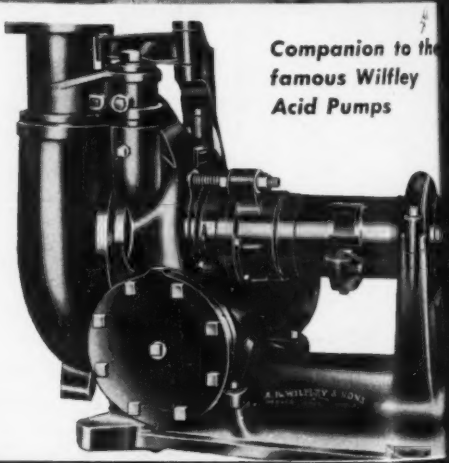

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